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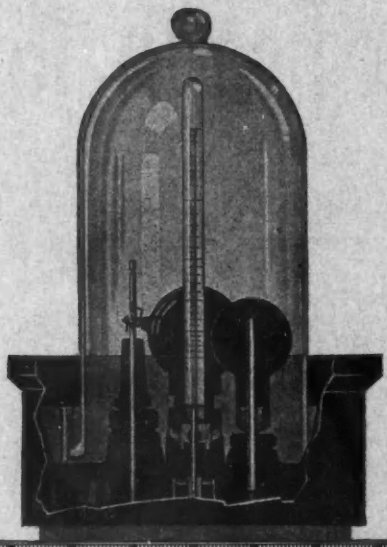

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Tuberculosis in Childhood as a Problem in Preventive Medicine

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THE problem of the prevention of tuberculosis in childhood may be divided into prevention of (*a*) bovine infection and (*b*) human infection. The former is relatively simple, the latter exceedingly complex. In a recent paper, Landis[1] has drawn attention to the comparative rarity of tuberculous cervical adenitis in children and has collected the evidence that obligatory pasteurization of milk is largely responsible.

He points out the error of considering nodes that are merely palpable, tuberculous, especially those of the cervical group, as was the tendency during the first few years of the anti-tuberculosis movement. The axillary, inguinal and epitrochlear nodes as well as the cervical are usually easily palpable during early childhood in all but fat children. As Landis observes, it is the single large node or a matted mass made up of smaller nodes bound together that suggests tuberculosis, especially if these are adherent to the skin or surrounding tissues. He refers to Cobbett's observation that it is the exception for tuberculosis to be limited to the cervical nodes, those of the mesentery and tracheobronchial region being commonly involved in children, and the lungs, almost invariably, in adults. Such a correlation is difficult *intra vitam*. Fraser[2], among 151 children, found four cases of demonstrable tuberculous cervical adenitis, none of whom showed, at the time (see footnote), evidence of tuberculosis of the tracheobronchial or abdominal nodes, although calcifications were present in the cervical nodes of two of these children.*

As Landis emphasizes, tuberculous cervical adenitis in children is usually referable to bovine infection. Among the children in attendance at the dispensary of the Henry Phipps Institute between 1904 and 1907, fifty-two showed a cervical lesion diagnosed tuberculous.

**Since this report was published, tracheobronchial node tuberculosis has been recognized in one of them. This child had helped nurse a sputum-positive friend.*

Of this number fifteen were under ten years of age and thirty-seven between the ages of ten and twenty. During the past two years but one clinical case has been recorded among the children attending the dispensary, the majority of whom are exposed through household contact to infection by way of the respiratory tract, but protected by pasteurization from infection through milk. Hetherington, in a survey of about four thousand children in seven of the schools of Philadelphia, did not find a case of scrofula[3]. The Ontario Survey found no case of acute cervical gland tuberculosis[4].

Turning to the prevention of infection with the human type tubercle bacillus, we find that the problem becomes extraordinarily complex and difficult. This results from the insidiousness of pulmonary tuberculosis, from its chronic course, during which periods of working capacity pass gradually into relapse, and from the consequent besetting economic difficulties. These characteristics, together with the long latent period between infection and clinical disease, [5, 6] and the well-established fact, startlingly emphasized by the surge of the morbidity and mortality rates in the war populations of the central European powers, that the difference between latent infection and manifest disease is largely a matter of stresses, suggest caution in predicting a time when tuberculosis shall become negligible.

For many years the emphasis of anti-tuberculosis work has fallen upon the importance of early diagnosis, and particularly upon the need of discovering tuberculosis in young adults who are just entering upon their period of economic usefulness. Not only is the disease in them rapidly progressive but it is essential to prevent the development of lesions so far advanced as to require prolonged treatment with the aftermath of disability. However, in the majority of cases it has been found that when tuberculosis causes symptoms sufficient to bring the patient to the physician it has already reached an extent that cannot be classed as less than moderately advanced. Logically, therefore, attempts have been made to learn if we can discover those who will develop the disease before the lesion is so extensive as to cause symptoms.

With this aim in view, examinations of children have been carried out by several agencies. The methods adopted fall broadly into two classes. One consists in the examination of all school children, the second in careful supervision of children who have lived or are living in household contact with sputum-positive or definite clinical tuberculosis and of their families. This scheme, in effect for some seven years at the Henry Phipps Institute[5], is a logical part of the work of the tuberculosis dispensary and is economically the easiest to justify. By a relatively small expenditure not only may measures be adopted to improve the general health of the household but many dangerous infiltrations may be discovered before they cause symptoms, at a stage when they yield most satisfactorily to appropriate treatment.

The aim of such supervision is, first, prevention of repeated massive re-infections by removing the infecting source or, where the patient cannot be induced to leave the household, by social service oversight to limit the dangers of contagion; second, an attempt to secure proper food and rest and general living conditions as satisfactory as the means of the family, supplemented when possible by organized aid, can afford; third, routine serial examinations, X-ray and physical, and by tuberculin test, of the children exposed to contagion within the family, to supervise their physical condition and to discover the earliest indications of infiltration.

The prevention of repeated infections in the household and the patient's need for adequate treatment alike make hospitalization or sanatorium care of the tuberculous patient desirable. There must be few physicians interested in tuberculosis who have not at one time or another wished for effective legal means to prevent a careless or intractable sputum-positive patient from living in the same rooms with young children. That the dangers of contagion from a careful person are grossly exaggerated is clear from the records and follow-up of households the habits of whose constituents are intimately known. The chief, perhaps the only material danger, from an intelligent patient is before he knows he has tuberculosis. It is the wanton disregard of decency in spitting and the flagrant revolt against careful and kindly instruction that defeat prophylaxis. Such an attitude not infrequently arises from the cumulative effect of the all too common experience of the tuberculous, a long neglected diagnosis, the indiscriminate packing of a large ward with cases in all stages of disease, food that at its best is unfamiliar and separation from accustomed haunts and friends. These are the more intolerable when the patient does not feel ill enough to submit to the restrictions necessary for his cure. The disastrous effect on the morale of the patient when the physician whom he first consults omits even a brief attentive physical examination and fails to make repeated examinations of the sputum has certainly never received sufficient emphasis from the point of view of agencies carrying out prophylaxis. When the diagnosis is made after months of delay both the patient and the family are disheartened and resentful. Other elements vital to the prosecution of treatment depend on modern sanatorium facilities and the extension of suitable aid to dependants. Both of these must be taken into account in a programme that deals realistically with tuberculosis and does not alienate patients by a grudging attitude of take it or leave it. An overwhelming responsibility rests on the sanatorium director and on his board to bring clearly before those responsible for its financial support the requirements of enlightened, adequate treatment. It is scarcely encouraging for the newly admitted patient to find himself in a ward with victims of the same disease in its last stages. Although it is desirable for the tuberculous to live in a community and learn from one another how

to restrict effort, it is not reassuring daily to see and to hear the evidences of dissolution. Perhaps only those who have had tuberculosis realize how distressing is the sound of incessant coughing.

With growing experience the emphasis of tuberculosis treatment falls more and more on rest. Rest must be adequate to meet the indications. The subsidence of symptoms and physical signs is not enough. The X-ray must show retrogression and scarring of infiltration, the process by which tuberculosis encompasses the destruction of the lung. X-ray films should be made at frequent intervals, not more than three months apart, both as a guide to treatment and as evidence that the course followed is furthering healing. A patient whose lesion is not retrogressive is not receiving treatment adequate to the purpose of hospitalization. Only too often this is because bed rest has been cut short. It is amazing in this day to find patients *with anatomically progressive lesions* not only out of bed but employed in the institution. Such employment is sometimes part of an effort to keep within low *per capita* appropriations for maintenance, a requirement that always carries with it the danger of subordinating the welfare of those consigned to the institution for healing to an inflexible, hand-to-mouth economy.

The second aim of family supervision, improvement of the general health, involves instruction in the usual measures of hygienic living. In addition, as Landis has repeatedly pointed out, by tactful suggestions the distribution of the family income may often be made to include a well-balanced diet when, without advice, neither adequate nor proper food is taken. In all cases, attention must be paid to racial predilections of diet.

The third aim of supervision is that of routine serial examinations of the other members, particularly the children, of the exposed household. These consist of tuberculin test, X-ray and physical examinations. The tuberculin test unless positive to the first dose should be repeated semi-annually or every three months in an infant known to be exposed. It should be given annually to older children. Routine X-ray examination should be made annually for all exposed children, with extra examinations for infants with positive tuberculin reactions and for older children, especially adolescents, who for any reason seem below par. Physical examination including temperature, pulse and height-weight relation should be made every three months and special examination during each illness with cough.

The tuberculin test should be made by intracutaneous injection, like the Schick test[7]. First one hundredth of a milligram of standardized[8] old tuberculin diluted to 0.1 cc. is used. The site is examined after forty-eight hours and if there is no reaction one-tenth milligram is given in the same volume as before. The site is again examined after two days and if no reaction has occurred, one milligram is given. The majority of children who have been seriously exposed to infection

will react to the first or second dose. It is rare that a child with a significant lesion reacts only to the third dose. The reaction is regarded as positive if oedema and redness are seen at the end of 48 hours. If there is no oedema the reaction is negative. Reactions are arbitrarily graded from one plus (+) to four plus (++++).

A reaction expressed by one plus (+) is a definite oedema, not more than 10 mm. in diameter and raised about 1 mm.; the area of redness is less significant and is usually much larger.

A reaction of two plus (++) is a well-defined oedema in an area from 10 to 15 mm. across and is raised somewhat more than 1 mm., with redness extending beyond the swelling.

A reaction of three plus (+++) is an extensive oedema measuring more than 15 mm., but no necrosis of the skin, and in a few instances redness extending along the course of the lymphatics adjacent to the site of injection.

A reaction of four plus (++++) is extensive oedema, redness and a spot of necrosis; it may be associated with malaise and elevation of temperature.

This method of administering tuberculin is much more accurate than others. It has been found, for example, that children who fail to react to the von Pirquet scarification test may be sensitive to the smallest dose given intracutaneously. Hamburger and Monti[9] tested a large number of children by the von Pirquet method and when there was no reaction injected after 48 hours 0.1 mgm. of tuberculin into the skin, and, if no reaction followed, 1 mgm. of tuberculin after another 48 hours. Among 509 children, 35.5 per cent reacted to the von Pirquet and 53 per cent to the intracutaneous test. Austrian[10] found reactions with the intracutaneous injection of 0.01 mgm. in children who were negative to the von Pirquet. In the von Pirquet method many factors influence the quantity of tuberculin absorbed. Certain dilutions are brought into contact with scarifications of almost inevitably varying depths; the solution may be rubbed off or may roll off, and the scratch may produce more or less serum, all of which cause great variations in the amount of the solution that is actually absorbed. By the intracutaneous method, a measured quantity is given into the epidermis under control of the eye, and thus reaches the desired site with accuracy. Using the intracutaneous tuberculin test we found[5] that in families having a member with sputum-positive tuberculosis infection occurs in 80 per cent of the children examined before the fifth year. When no source of infection resides in the household, only 20 per cent of the pre-school children react to tuberculin.

As a result of X-ray examinations, among children living in household contact with sputum-positive tuberculosis, 19.7 per cent were found to have demonstrable tuberculosis of the tracheo-bronchial lymph nodes, whereas among the non-contact or control group there were 4.3 per cent who showed such lesions. The criteria for diagnosis

are fully discussed elsewhere[11]. In each case the lesion was a clearly defined mass. Broadening or thickening of the hilum or mediastinum without sharply defined rounded masses is not sufficient for such diagnosis, such apparent broadening being in many instances artefact, such as may be caused by depth of respiration or cardio-vascular movement at the time of X-ray exposure. Again, in these two groups of children tuberculous pulmonary infiltrations have been found in more than 13 per cent of the contacts, and none have been found among the non-contacts. Of these pulmonary infiltrations several were first observed in the latent stage.

The X-ray examination should include postero-antero stereoscopic and flat oblique (not lateral) films. A fuller discussion of the method and criteria of a satisfactory film is given elsewhere[11]. Here it may be noted that no film can adequately record early lesions in which the normal vascular arborization is not clearly recorded. If account is taken of the fundamentals, the anatomical and physiological properties of the chest and the chief mechanisms in the production of roentgenograms, the physician has an accurate and reliable aid in the X-ray film. Interpretation must be based on appearances shown in films of the excised lung that is later carefully sectioned. Under these conditions most latent lesions may be recognized in their early stages and it will be rare indeed that the anatomical basis of a lesion sufficient to cause symptoms cannot be accurately defined and its progress or retrogression recorded.

No consideration of the prevention of tuberculosis would be practical that did not take account of the difference in its typical course at different age periods. Although there are exceptions, tuberculosis during infancy, especially during the first six months, tends to run an acute course. There is usually a rapidly spreading pulmonary consolidation with marked enlargement of the associated lymph nodes both of the hilum and of the mediastinum. The immediate cause of death is typically meningitis. With each succeeding six months until the end of the second year of life, the typical lesion follows a less violent course, and if the infant can be carried along for a few months there may be retrogression of the consolidation and eventually healing of both the pulmonary and nodal lesions. In every case in our experience with infants in which this happy result has occurred there has been cessation of the child's contact with the source of infection. (See figure 5 of reference[11]).

The source of infection may, of course, be any sputum-positive member of the household or it may be some one who comes into brief contact with the infant. Although the histories of sputum-positive families under the care of the Phipps Institute suggest that transient contact is of slight danger, nevertheless, cases have been reported of severe infection following brief handling of an infant by a patient with positive sputum. Because of the seriousness of infection during

infancy, it should be insisted that any patient suffering from tuberculosis should not be permitted near, much less be allowed to handle an infant. It is sometimes extremely difficult to enforce this precaution. For example, at the time of writing there is difficulty in keeping a young aunt with positive sputum from her nephew. She is awaiting admission to a sanatorium and is so distressed by the knowledge of her illness that her sister, the infant's mother, hesitates to insist that she shall not see the baby.

Contagion sometimes results from infection by a nurse or governess. Two cases were recently observed by Dr. Landis, in which a governess was the source. In one of our clinic families, a tuberculous maternal aunt aided in the care of an infant by day while also nursing her tuberculous son. The infant died of tuberculous meningitis. As was formerly reported[5], tuberculosis in the parent is more infectious than tuberculosis in a brother or sister, but the difference is dependent upon the duration and closeness of contact.

Among infants not exposed to open tuberculosis the incidence of infection is low as is shown by the tuberculin reaction. Tuberculous pulmonary lesions are very rarely found even when routine serial films are made. If a tuberculous pulmonary lesion is found in an infant not known to be exposed, examination of those handling the baby will rarely fail to discover the source of infection.

Largely because of the seriousness of tuberculosis in the new-born, great interest attaches to the attempt to render the infant immune by prophylactic vaccination. The Bacillus Calmette-Guerin (BCG) vaccine has been used in France on over 100,000 babies[12], and is being employed by workers in several other countries. The BCG vaccine consists of living bacilli of the bovine type cultured on five per cent ox-bile-glycerine for the past twenty-one years. It is given orally within the first ten days of life in three doses separated by forty-eight hour intervals. Each dose contains 10 mgm. of bacilli in 2 cc. of physiological salt solution. It is claimed that by its use in babies of tuberculous families in France, there has been a reduction from a general mortality of approximately 21 per cent and a tuberculosis mortality of 15.9 per cent to a general mortality of 11.8 per cent and tuberculosis mortality of 3.4 per cent.

These are remarkable figures and if unchallenged would establish incontestably the value of the method. However, quite aside from objections based on the statistical methods employed and the inferences drawn from them, the evidence that contact with sputum-positive tuberculosis existed in the vaccinated group is not satisfactorily established. A diagnosis of clinical tuberculosis such as is made in many dispensaries is not sufficient evidence that the other members of the household are exposed to sputum-positive disease. The exact length and intimacy of contact with a case of sputum-positive tuberculosis

must be defined in order to draw conclusions as to the chances of infection, more particularly of infection sufficient to lead to fatal tuberculosis. Close supervision of infants drawn from sputum-positive families has shown that brief contact may result in no lesion, nor even a positive tuberculin reaction. Furthermore, several infants, two in one contact household for example, have shown pulmonary infiltrations that they not only have survived successfully but that may cause only moderate symptoms or none at all. This applies to lesions large enough to leave behind calcium and dense strands as they clear. It is the prevention of prolonged or intimate association with the source of infection that is fundamental to the successful treatment of an infant. The separation of the infant from the infecting source for some four weeks following vaccination, as practised by Calmette, is not only significant as a period in which no infection can occur but also as a time in which the infecting source may be removed from the household. This is, at least in this country, a very important consideration, since sometimes the patient is hospitalized soon after diagnosis.

Again, in estimating the value of BCG vaccination, one must not lose sight of the vital factor of the willingness of the family to carry out every possible precaution that the infant be not infected. Keresturi[13] also emphasizes this point. This quality, summed up by the social service as coöperation, is much more highly developed in those who accept BCG vaccination than in those who think it too much trouble. It is quite possible to have effective isolation of a patient in the household.

Lastly, in considering the desirability of BCG vaccination, one must consider briefly the experimental evidence for its safety and efficacy that preceded and followed its employment both abroad and on this continent. Opinion is divided as to whether successful vaccination causes a positive tuberculin reaction[12, 13, 14] and around this centres discussion as to whether there can be relative immunity without sensitization. From tests made of infants of families under the care of the Phipps Institute, Aronson concludes that successful oral vaccination with BCG causes a positive tuberculin reaction. It is not unlikely that some negative reactions reported by workers with this vaccine are due to failure to secure vaccination. Oral dosage is difficult to control both because of regurgitation and because much or all of the dose may pass through unabsorbed. Keresturi appears to feel that only changing intracutaneous reactions indicate hypersensitiveness due to BCG. Analysis of her tables provides many questions; for example, why should the percentage of babies over one year of age showing a positive intracutaneous reaction after BCG be nearly the same among those exposed to sputum-positive contact (29 per cent) as among those exposed to tuberculosis with negative

sputum (27 per cent)? This is widely at variance with our tests on contact and non-contact infants of this age that have not received BCG. Keresturi's results cannot be wholly assigned to BCG since in the same series the vaccinated babies with no exposure showed only half as many positive reactions (13 per cent) as the other two groups. The number of vaccinated cases are, as Keresturi points out, small and the time of observation as yet too short. Again, as the author further also points out, sputum-positive contact in many cases is extremely brief. The difficulties of exact control are enormous and will be appreciated only by those who have tried to ascertain the length and severity of sputum-positive contact.

The claim that BCG cannot become pathogenic has been attacked by several workers. Watson[15], on the basis of inoculation experiments, and Petroff, Branch and Steenkin [16, 17], on the basis of dissociation by cultural methods, have reported that the BCG culture contains pathogenic microorganisms. This work is important and commands attention. Nevertheless, on the basis of the large number of inoculations already made, one may doubt that vaccination by the prescribed method with the designated dose is a material risk for babies who must remain in contact with open tuberculosis. For these, at least, the measure is worthy of trial, but removal of the source of infection is still the effective and wholly desirable measure of prevention. For infants not in contact with sputum-positive tuberculosis, BCG vaccination may well be held in abeyance since its value is not incontestably established. And when one excludes all babies but those born into households containing a member with positive sputum, the number of infants to whom it will be applicable is, on this continent, surprisingly small. This has been our experience over the past two years within our section of Philadelphia and it agrees with that of Keresturi in New York.

Although the line of division between the lesions of infancy and early childhood is by no means sharp, from the second year on the rapidly progressive pulmonary consolidation, a characteristic precursor of miliary tuberculosis, is less common. Nevertheless, almost every form of pulmonary tuberculosis may be seen in early childhood and adolescence. Acute, even fulminating, infiltrations are represented; these are chiefly non-apical in children, and in adolescents appear first, somewhat mottled or strand-like, in the extreme apex and extend laterally, then tend to consolidate and excavate, with which change in structure symptoms not uncommonly appear for the first time. Chronic indolent infiltrations that cause little or no disturbance of health appear in young children as spots and strands in the lower two-thirds of the lung and in adolescents as strands or salients projecting into the lung field from a base on the pleura, appearing in the X-ray film as inverted mountain ranges. The apical lesions

are rarely indolent throughout their course if observation is continued over a period of years.

Certain characteristics of pulmonary tuberculosis in childhood require special consideration. The first of these is the latent period. We have used the term latent somewhat arbitrarily, but in a sense not dissimilar from that used by Laennec to designate a lesion that, although anatomically demonstrable, does not produce symptoms recognizable by the patient or physical signs detectable by the usual physical examination. There is, obviously, no sharp demarcation between latent and clinical disease. A lesion may escape one physical examination but be discovered by another. Nevertheless, it is not a definition merely distinguishing between the skill of examiners. There are numerous lesions readily demonstrable by X-ray that escape the most careful examination, sometimes because of the area involved. For example, in young children, lesions situated in the base of the lung, especially if close to the heart, may cause no change or at most a difference of expansion so slight as compared with the uninvaded side that it is held by the trained examiner to be within the limits of variation between one side and the other. It is idle to ascribe a trivial difference in signs to the lesion when the child in whom it appears cannot be picked out from a group of normal children by an examiner unacquainted beforehand with the X-ray films of the child. Likewise, not a few of those apical infiltrations that reach their maximum density at the third or fourth interspace at the posterior axillary line remain undetectable by physical signs. Perhaps in this region the impossibility of displacing the scapula and its attachments prevents physical diagnosis; certainly serious lesions in this site escape tried search of axillae and back. A fuller discussion of the latent period is given elsewhere and typical illustrations are reproduced[11].

The latent period varies widely in duration. It may be only two or three weeks during which a consolidation develops in an infant before the first symptom, often cough, appears. It may be as much as two or three years during which an infiltration in an adolescent, if untreated, descends from the extreme apex, where it is recorded roentgenographically only by special attention to recording this region, into the subapical areas, where it is readily perceptible and usually, but by no means always, productive of symptoms. The slow or moderately rapid anatomical spread of pulmonary infiltrations without associated signs or symptoms is not infrequently observed by serial roentgenograms of children living in household contact with sputum-positive tuberculosis. Instances are illustrated, with clinical notes, in figures 27, 28 and 29 and again in figures 30, 31 and 32 of reference[11].

From the point of view of the prevention of clinical tuberculosis in children, nothing is more important than recognition of the above aspects of latency. It is only by serial roentgenograms of contact

children that one can discover how a lesion, while remaining latent or silent in the clinical sense, may progress rapidly. Consolidation and even excavations may be shown to develop without either symptoms or physical signs. Yet because of the convention established by the arbitrary description of clinical activity, there are those who regard such lesions, as long as symptoms and signs are lacking, as scars or as negligible. The mechanism by which tuberculosis accomplishes its destruction of the lung and eventually of life is infiltration and excavation. There is no method that records this invasion, its fluctuations, and its progress or retrogression with accuracy approaching that of the X-ray. Verification of this may be easily obtained. Serial semi-annual examinations of children showing infiltrations will discover lesions that cast soft, ill-delimited shadows, the extent of which and their tendency to remain discrete or become confluent is often wholly independent of the *immediate* evidence of signs and symptoms. If the examinations are carried on far enough it will be found that although symptomless retrogression may occur leaving no shadow or only a few strands, especially with lesions of the childhood type, the majority of the adult type infiltrations sooner or later produce symptoms. Rapid spreading may precede (figures 27, 28, 30 and 31, reference [11]) or accompany (figures 34, 35, reference [11]) symptoms.

In the supervision of tuberculous children account must be taken of the rapidity with which severe lesions develop and spread. Rest must be prompt and adequate to meet the indications. Even in the absence of all other evidence of illness, absolute rest in bed should be given all children with infiltrations recorded roentgenographically as soft, ill-delimited shadows that become confluent or that increase in number. Such lesions are acute and for them long sanatorium waiting lists and ambulatory treatment are as inappropriate as for any other disease that immediately threatens life. Furthermore, balanced against the violence of its advance, tuberculosis of children shows a capacity for rapid retrogression and healing, including the disappearance and healing of moderate and, occasionally, even large cavities, that is nothing short of amazing. The allocation of infirmary beds should be based on these facts. Sufficient beds to care for all dangerous lesions in children and adolescents should always be at the disposal of the tuberculosis service, whether hospital or sanatorium. There is nothing more gratifying in the treatment of tuberculosis than the great possibilities of repair that attend the institution of prompt, complete and sufficient rest for the violent lesions of childhood.

Linked with this remarkable responsiveness to treatment is a great hazard, the tendency to sharp and disastrous relapse from the apparent well-being that marks the subsidence of symptoms, the gain in weight and the clearing of signs. This has long been recognized but it has not received sufficient practical emphasis. Retrogression is

marked conspicuously by the relatively rapid subsidence of symptoms and the slowly acquired anatomical stability of the lesion. This disparity is common to tuberculosis at all ages. Because of the wholly inadequate emphasis that is laid on the pathological condition of a lesion as revealed by X-ray, the current definition of activity suggests, after symptoms cease, a security that is utterly misleading. Clear understanding of the significance of the types and changes within X-ray appearances of infiltrations is invaluable in the treatment of tuberculosis in children. Such understanding can be readily acquired by study of the course of involution of infiltrations and check-up of the fate of the children in whom they occur, by comparison of X-ray appearances in the living with those of excised lungs, which may be exhaustively examined, and by giving due weight to the fundamental physical and physiological factors involved in the making and interpretation of the roentgenogram. Knowledge of these points is peculiarly important in the care of the child because of the danger of losing the opportunity to heal him so that his volcanic illness will not erupt again. In proportion as the patient is young, with the greater liability to disastrous relapse, and the more of life to face handicapped by whatever irreparable damage may follow failure to make the most of his splendid capacity for repair, by so much ought we to make sure that he is not discharged from care until material restrictions can be safely discarded. Especially in children do the symptoms, then the physical signs, disappear before the lesion is stable enough to carry the load that the necessities and heedlessness of the patient may throw upon it. The fundamental principle in the treatment of tuberculosis should be to secure evidence that the means by which the disease causes damage is brought to an end. Elevation of temperature and of pulse, malaise and fatigue are, properly speaking, late effects, coarse indices of activity. The sedimentation test and the differential blood count are often of importance in determining the need for rest. But the conclusive evidence of healing of a pulmonary tuberculous lesion is to be found in the sharp dense strands that remain stable under close roentgenographic control. Although the roentgenogram will never be one's sole reliance for examination and supervision of patients, it is even now the method of precision for detecting the presence and evaluating the extent, severity and direction of change of a lesion.

Probably few more exacting and difficult tasks fall to the lot of the physician than the supervision of a child in whom the chief or sole evidence of a dangerous lesion is found in X-ray appearances. Both parent and child resent the interference with liberty imposed upon an apparently healthy person. If the parent is the source of infection and was not made seriously ill by the lesion from which the child, in his earlier days, acquired his infection, the physician, in securing adequate rest, will need all his philosophy and endless persistence. But it is rare, surely, that he will feel entitled to a greater

satisfaction than when he knows that of a group of children whom he has successfully cared for in an effort to prevent clinical disease, not a few owe this freedom largely to his guidance.

As has been seen, the supervision of children known to be exposed to contagion within their homes is one of the two general methods adopted in the effort to prevent tuberculosis. The other consists in the routine examination of children in the schools. This method has varied widely[4, 7, 15, 19] in its scope depending somewhat on whether tuberculosis only was the object of the survey or whether other lesions were sought. If all causes of ill-health are sought, the tuberculin test, physical and X-ray examination are applied to all children, with the additional advantage that many cardiac and non-tuberculous pulmonary lesions may be discovered in those who do not react to tuberculin. The disadvantages lie in the difficulty of examining in one or many years all the school children of a community. Another obvious disadvantage is cost and still another, and greater, is lack of personnel adequately trained in the methods of examination. Nevertheless, by referring all roentgenograms to a physician familiar with interpretation much may be accomplished.

A modification that greatly reduces time and cost attempts to select for examination children who are likely to show tuberculous lesions. Except for preliminary examinations of whole schools to secure a control, this scheme was adopted in Philadelphia, guided by the experience gained in the investigation into the contagion of tuberculosis[5] carried out at the Henry Phipps Institute. Much the same procedure was used independently by Rathbun[19], who, for many years, has vigorously prosecuted an excellent survey of tuberculosis in the schools of Chautauqua County, New York.

It is explained to the parents that the opportunity is presented to have the children examined, and those that give evidence of serious infection or beginning disease properly cared for. The tuberculin test is made on all children whose parents consent to the examination. This first step reveals only children who have been infected. The intensity of the reaction is, in a general way, a measure of the significance of the infection, but accurate deductions as to the extent or stage of the underlying lesion cannot be drawn from the tuberculin reaction alone. A child with a marked reaction may present neither a lesion large enough to be demonstrable nor any evidence of ill health and may remain entirely well for years despite a reaction of continued intensity. Likewise, in rare instances, a mild reaction to as much as 0.1 mgm of O.T. has been observed shortly before the development of a demonstrable pulmonary infiltration (figure 27 of reference [11]).

As has been noted, the majority of significant tuberculous lesions occur in children reacting to the first two doses of tuberculin. Further examination of these groups requires adequate roentgenograms and,

if sufficient trained medical personnel is available, a competent physical examination. If not, physical examination may be restricted to those children in whom a pulmonary lesion is discovered by the roentgenogram, or who present roentgenographic evidence that is inconclusive. The rarity of the latter alternative will be directly proportional to the adequacy of roentgenogram and interpretation. The temperature, the pulse and the height-weight relation should be recorded when physical examination is made. These are important in discovering and evaluating clinical disease. As various reports show, they are not indicative of the "pre-tuberculous" condition or of latent lesions, [3, 4, 6, 11, 19].

A large part of the cost of such school surveys is that for X-ray apparatus and films. Judged strictly from the results in lesions discovered it may appear somewhat high. Since many significant lesions readily discoverable by X-ray escape even the most skilled physical examination, prolonged, as it must be, to twenty minutes or more per child, it is impossible to compare the two methods on a cost basis. Possibly the most economical method for the examination of large numbers of children may be found in fluoroscopy. That this is decidedly more rapid and dependable than physical examination is clear from the experience of Reid[20]. The initial cost of apparatus is less than for machines capable of good roentgenographic technique and by its means all doubtful cases may be referred to a hospital for confirmation by a large X-ray machine. Doubtless in examination of the base of the lung, where the effects of cardiac movement are at their maximum, fluoroscopy falls most definitely behind the roentgenogram; nevertheless, if the fluoroscopic examination is used as a sieve to select suspicious cases it should be of great value in the rapid survey of large numbers of children.

The results of various school surveys are difficult to compare because of the difference in the methods employed and in the populations among whom the surveys have been conducted. Chadwick[18], using the von Pirquet test, reports from Massachusetts that of 26,345 children 28.5 per cent reacted. The occurrence of reactions among contact children was twice as great as among non-contacts. "Hilum tuberculosis" was diagnosed in 4.8 per cent of the children roentgenographically examined. Children whose films recorded infiltration "as shown by mottling and fibrosis in the parenchyma were classified as having pulmonary tuberculosis." At the ages of fourteen and fifteen years one per cent of the children were considered to have this evidence of tuberculosis.

The Ontario school survey[4], using a single intracutaneous injection of 1/20 mgm. of O.T. in 1/50 cc., found 32 per cent reactors in a mixed urban and rural population. At the tenth year 40 per cent were infected; at the fifteenth, 50 per cent. On the basis of X-ray and

physical examination "practically 1 per cent were classified as having active pulmonary disease".

Rathbun[19], in Chautauqua County, New York, reported 3.3 per cent of 3,678 children as having tuberculosis of the tracheobronchial lymph nodes. Since he found that from 50 to 75 per cent of the adolescent children who showed pulmonary lesions also presented demonstrable lesions of the lymph nodes, he recommends special precautionary measures for children with demonstrable lymph node lesions.

In the Philadelphia schools[7] the tuberculin test showed that 37.7 per cent of the children are infected at the age of five years and 90.2 per cent at the age of 18 years. Roentgenographic examination together with physical signs and symptoms revealed pulmonary tuberculosis in 0.5 per cent of children attending school. Clinical disease was more frequent in high school children than in those of the elementary schools, and occurred twice as often in adolescent girls as in boys of the same age. Sanatorium treatment is advisable for children with clinical disease until symptoms disappear and the lesions are anatomically stable. Latent apical tuberculosis, such as is usually the precursor of clinical tuberculosis of the adult type, was found in 1 per cent of adolescent children (of high school age). Children with this lesion should be under constant supervision including careful comparable roentgenograms, and should avoid over-strain. Those whose lesions look soft or appear unstable should receive sanatorium care.

Latent tuberculous pulmonary infiltrations of the childhood type were found in more than one per cent of the children. This lesion may precede or develop into grave disease. Children who have it should be kept under observation until it is evident that the lesion is stable. These infiltrations are to be distinguished from the chronic infectious, non-tuberculous pulmonary diseases that often follow measles, pertussis and the bronchopneumonias of childhood. Non-tuberculous infiltrations are, in Philadelphia at least, more prevalent than the tuberculous in children under 10 years of age. Among the Italian and Negro population, economically the worst off, more than 5 per cent present chronic non-tuberculous pulmonary disease.

Latent tuberculous nodular foci in lungs and the associated lesions of the tracheobronchial lymph nodes are found in more than 10 per cent of the school children. Demonstrable tracheobronchial lesions are an index of heavy infection. They vary from massive caseous nodes, which under observation may usually be observed to calcify in favourable cases, to dense calcifications that are already healed when first observed. The significance of demonstrable tuberculosis of the tracheobronchial lymph nodes is determined by the evidences of the stage of the lesion (fresh and soft, or old, densely calcified), by the recency of exposure to open tuberculosis of the child in whom it is recognized, and by the severity of the tuberculin reaction, and by

associated infiltration of the lung if demonstrable. These factors are more fully discussed elsewhere[11]. Enormous lesions of the lymph nodes may result from a pulmonary focus so small that in the living it is obscured by a rib or the diaphragm. On the other hand, large, fresh, soft tuberculous pulmonary infiltrations may be seen without any anatomically demonstrable lesion of the associated lymph nodes.

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Cultural Methods for Release of Scarlet Fever Patients

THE usual cultural, biochemical and serological tests and the tests for toxin production, all fail to differentiate the haemolytic streptococci isolated from patients with scarlet fever from those from convalescent carriers or to indicate their probable pathogenicity for human beings. In the present state of our knowledge, therefore, a system of quarantine based on a bacteriological examination would be impracticable.—*A Comparative Study of Haemolytic Streptococci from Patients Convalescent from Scarlet Fever, by Mary B. Kirkbride, Mary W. Wheeler and Cutler D. West, published in the Journal of Infectious Diseases, Volume 47, No. 1.*

Registration of Resident and Non-Resident Deaths*

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VITAL statistics are not simply a collection of figures which serve merely to record past events. To the health officer or the health worker, vital statistics are an accumulation of facts, expressed as figures, which are of constant practical use to him in his daily problem of preventing disease.

Without vital statistics, we would be ignorant as to the problems which face us; we would not have any accurate knowledge as to the extent of any specific problem or its relative importance. We would not know what results had been obtained by health programmes; we would not be able to compare our present position with the past, or with that of our contemporaries. Even with vital statistics at our disposal, we face many difficulties in endeavouring to reach fair and accurate conclusions; without such aid, we would be groping blindly in the dark, trusting to impressions which are never accurate or reliable, and guessing at what is not subject to conjecture. A sound health programme can only be built up on the basis of an understanding of the problems, and a regular review of the progress made or not made. Consequently, a sound health programme practically depends upon having available reliable statistical information.

The question which I, as a health worker, desire to present to you is as to whether or not our present system of recording births and deaths is satisfactory, considering that these records are based on the place of occurrence of the events. The health worker wants facts, and we must consider, therefore, whether or not our present system of recording vital statistics is providing the facts required on a basis which gives a true picture of conditions in any one locality, or whether or not the picture is distorted.

The health worker wants to know the general mortality rate, the infant mortality rate, and the mortality rates for certain specific diseases, particularly for those in the communicable disease group. He wants these facts to cover the unit of population in which he is interested, and he does not wish to be misled by vital statistics which do not represent the true and actual situation.

This requires, first of all, a fairly accurate census. In most centres of population in Canada, the Dominion census taken every ten years

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is not of sufficiently frequent occurrence to allow for accurate estimates of the population between the census years. The result is that since every community desires to be larger than it really is, the estimates—or guesses—made are far above the actual figure; then, when the census is taken, the cry is made that it is inaccurate. In Montreal, at present, it is commonly stated that the population is over a million. The statisticians of the municipal and provincial departments estimated it at 742,000 in 1928. It can readily be seen that such differences as this would entirely change the mortality rates, and it can also be seen that there will be some rather unpleasant discussions after the next census.

That is not, however, the particular point to which I wish to refer. The point is rather that as long as births and deaths are credited to the place of their occurrence, and not redistributed according to residence, we have not an honest statement of deaths and births, and the conclusions based on such inaccuracies are bound to mislead the health worker. Under existing conditions, the location of hospitals, of sanatoria and of other institutions, plays a considerable part in determining the death rate of the locality where they are placed, irrespective of whether or not the deaths occurring in these institutions are deaths of residents or non-residents.

In the city of Montreal, out of a total number of deaths of 10,961, in 1928, some 616 were those of non-residents. In Toronto, in 1929, there occurred 1,062 deaths of non-residents out of a total of 7,182 deaths—nearly fifteen per cent. These cities can, of course, deduct the deaths of non-residents, and show a death-rate corrected as to residence, but not fairly so, since they deduct the deaths of non-residents, but do not add the deaths of their own residents occurring outside their own limits.

The city of Toronto publishes a tabulation for tuberculosis which shows that, in 1929, there occurred 253 deaths from tuberculosis in the city, and 103 deaths of Toronto citizens, from this disease, outside the city. This, of course, covers only the knowledge they have, and the statement is limited practically to cases for whose maintenance in sanatoria the city is making a contribution and so is provided with information covering such deaths.

In Montreal, the tuberculosis death rate has rapidly decreased, but what is the true picture?—how far has the rate been lowered by the opening of one sanatorium outside the city to which citizens go, and how much is the rate raised by institutions for late cases which are situated inside the city limits, but which serve a wide area outside of the city? In the province of Quebec, we find abnormal tuberculosis rates in the counties where the tuberculosis sanatoria are situated. In 1928, the rate for Terrebonne County was 240 per 100,000 because of the location of a tuberculosis sanatorium in that county.

It is perhaps true that the number of deaths of citizens of the larger centres of population, exclusive of tuberculosis deaths, which occur

outside of the city, is not sufficient to distort the vital statistics, but, certainly, the vital statistics for rural areas and for those centres, which many of their residents leave to go to the larger centres for institutional care, are of such little value as to make them practically useless. On Montreal Island, for example, we have the city of Montreal surrounded by several independent municipalities. That is, they are independent as to government, but, nevertheless, dependent upon the city of Montreal in many ways. The hospitals are practically all located in the city of Montreal, and to these hospitals come the citizens from the adjacent municipalities. Their children are born in Montreal proper, and many of their deaths occur in the city. The citizens of these neighbouring municipalities do contribute generously to the hospitals, but that does not help the accuracy of the vital statistics.

We find in the Province of Quebec Statistical Report for 1927 that the city of Westmount has a birth rate of 1.9, and Outremont one of 5.7; the infant mortality rate is 26.3 and 29.6 respectively; and the general mortality rate, 3.6 and 3.1, respectively. It is evident that the vital statistics of these two cities are of no value, and the health officers of these and similar centres are without the necessary means to guide and evaluate the health work.

The city of Montreal suffered in its infant mortality rate because until 1925, the Grey Nuns' Creche was situated inside the city. This creche had a mortality of between eighty and ninety per cent, and as the institution received foundlings from everywhere, the city of Montreal was charged with an abnormal number of infant deaths. The Creche moved outside the city in 1925, and Montreal's infant mortality rate was, accordingly, definitely decreased. To some extent, this was correct, as many of the infants did not belong to Montreal, but it was not accurate in so far as the infants actually born in Montreal were concerned. It should be noted that since the move, the mortality of infants in the Creche has steadily and rapidly decreased, until, in 1928, it was thirty-five per cent instead of the previous eighty or ninety. Referring to this situation, the Montreal Department of Health report for 1925 states:—"When this institution was in the city, most of the births of children admitted and all deaths occurring there were included in the City's statistics". Commenting upon the move outside of the city, the same report says:—"It would not be fair, it seems, to include in the statistics of the city, that of the foundlings' institution, and we decided to suppress it for births as well as for deaths".

To sum up what has been said, it appears that as long as deaths and births are recorded according to their place of occurrence, the vital statistics will not provide a true picture of conditions, and, therefore, are sure to be misleading.

If births and deaths were recorded according to residence, and if our vital statistics were based upon residence rather than upon the place of occurrence of the births and deaths, a move would be made in the

direction of securing vital statistics which would be closer to what would be of value to the health worker. The health authority cannot know the health conditions of his area unless he knows the rates covering all the citizens of the area, irrespective of whether or not the actual occurrence of birth or death took place in the area.

Some difficulties can be foreseen, as in the case of children's institutions. The child may not have established any residence; the parents may be unknown. Special regulations would be necessary for special cases, but, generally speaking, it should not be difficult to determine residence and redistribute the statistics on the basis of residence. It is suggested that the definition of residence might follow the rules according to which allocation of residence is made on the census.

To continue our present system is to persist in a way that, unquestionably, vitiates the value of vital statistics in many places, and if we are convinced that vital statistics are essential to a proper health administration, public health should support a movement to improve the methods of their compilation.

The Future of Medical Practice

"NO one will deny that, from the standpoint of curative medicine, it is fundamental that the personal relationship between physician and patient should be preserved. On the other hand, it cannot be denied that modern medical science has put a new concept in the field of medical practice. Today we are on the verge of a revolution in this field. Modern medicine, and particularly modern preventive medicine, is fundamentally the interpretation and application of modern medical research. The discovery of the germ theory of disease has changed the picture almost completely. If the full value of this discovery is to be gained, knowledge of it must be universal. Education in this field must begin with the child; it must be made a part of our public school education. It must be given to the adult. It must find its practical application in the type of health centres such as you have developed in this community. Modern medicine, viewed from this point of view, is a cooperative undertaking. It involves a definite understanding between the physician, the parent, the child, the teacher, the public health administrator, and the legislator. Only through such concerted, cooperative effort, involving everyone in the community, can we hope to reach the goal which preventive medicine has set for us—the reduction of disease to its minimum and the prolongation of life for one and all to the full biological limit."—*An address delivered at the Dedication of the West End Health Center, Boston, Mass., September* 15, 1930, *by Lee K. Frankel, Ph.D.*

Iodine Prophylaxis and Endemic Goitre

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SINCE iodine prophylaxis suggests deficiency of this element any critical examination of the need for such prophylaxis must be associated with consideration of the distribution of iodine. Throughout the earth's surface this distribution is unequal. It is now generally believed that the animal inhabitants of many wide areas suffer from a real deficiency of iodine in their diet and require some form of prophylactic treatment.

In this paper I propose to set forth the most important facts now available bearing upon (i) the distribution of iodine in nature, and a correlation of that distribution with thyroid diseases and in particular with simple endemic goitre, and (ii) the different methods of administration of iodine that have been tested and their results. From critical examination of such data it may be possible—always bearing in mind the potential danger of administering iodine to patients with certain abnormal thyroid conditions—to draw definite conclusions as to the most satisfactory form of prophylaxis that should be employed. If it be found that such conclusions cannot at present be drawn, at any rate the gaps in our present knowledge hindering this advance should be revealed. The further question of the degree of compulsion desirable to employ with such prophylaxis cannot be avoided in any complete treatment of the subject.

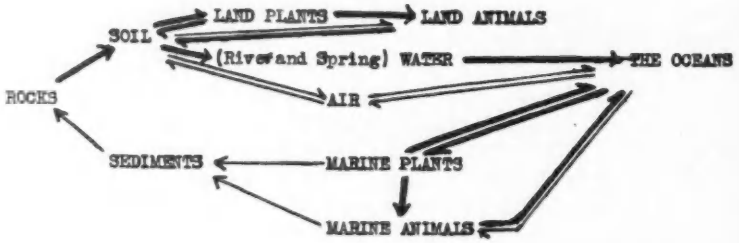
The Distribution of Iodine in Nature and the Correlation of that Distribution with Simple Endemic Goitre

Since the discovery of the element iodine in 1827 by Courtois, the numerous efforts that have been made to determine its distribution throughout inanimate and animate nature have gradually grown more accurate with improvement of analytical procedures for its detection and estimation. Earlier work, especially that concerned with the biological distribution and its significance, was largely vitiated by lack of accurate technique. It is the more remarkable that the results of the researches of Chatin some seventy or eighty years ago[8] have been largely confirmed within the past few years. Accurate procedures for the estimation of traces of iodine in plant and animal tissues became available only in the early years of the present century. For them we

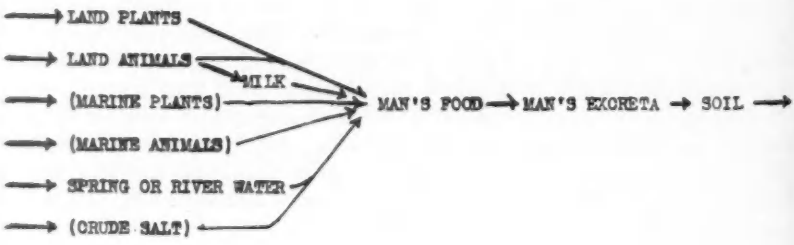
are indebted to Bourcet[5], to Andrew Hunter[28] and to E. C. Kendall[35]. In papers published in 1914 and 1915, I gave a résumé of the distribution of iodine as then known, based upon such procedures[7]. Within the last decade still greater refinements have been introduced, especially by von Fellenberg[11], and the statement is probably warranted that minute traces of iodine can be estimated more accurately than can those of any other element, with the sole exception of such as are detectable by radioactive procedures.

With the methods now employed we need not here concern ourselves. They call for a high degree of technical skill, and the results must needs be expressed in micrograms, millionths of a gram, for which the unit "gamma" (γ) is employed. The accurate knowledge now available rests chiefly upon the work of von Fellenberg and his pupils, especially Lunde of Norway, and of McClendon (United States), and Hercus and Roberts (New Zealand), who have employed methods comparable in accuracy with those of von Fellenberg.

Most of the facts concerned with the circulation of iodine in nature are represented in the following scheme (modified from Lunde[43]). In this the different cycles are obviously of differing importance, and an attempt has been made to indicate the main channels of circulation by heavy lines:



In addition to these natural cycles, man, through his use of marine food, and formerly of crude salt, has introduced artificial channels, so that the scheme, as far as man and those domestic animals whose diet is controlled and altered by man are concerned, must be modified as follows:



While man, the individual, may be able to control and select a varied diet, drawing upon all the usefully available sources of iodine, man, the community, does not normally do so, but is limited largely to the sources provided by his immediate surroundings. By contrasting the iodine content of the different food sources of man, of the material from which these plants and animals derive their iodine, and of the water-supply, for non-goitrous and for goitrous districts, it becomes apparent at once that in the latter there is a definite lower level of iodine content, and we may therefore conclude that there is a relationship between the lower level and the incidence of endemic goitre. Figures exemplifying these statements are given in Table I.

(Stiner (I.C.G., 389) criticises the application of von Fellenberg's results (11 and 14) on several grounds. Thus he states that La Chaux de Fonds and Effingen should not be considered as non-goitrous to the extent inferred by von Fellenberg. Also that analyses of foods for iodine should be of foods as brought to the table, and not as purchased, since in particular after the customary cooking of spinach with much water "we can hardly expect that any iodine or other easily dissolvable substances have remained in the spinach (I.C.G., 391). While the second criticism is quite an important one, the example selected was unfortunate, since Miermeister (48) has since found that of the 44γ of iodine present in 100 gm. of fresh spinach only 8 per cent is lost during cooking, the iodine being present chiefly in insoluble organic combination.)

A further clue to the relationship between iodine circulation (and therefore iodine supply) and the occurrence of goitre is given by estimations of iodine excretion. In the body iodine is found in traces in every tissue but is invariably stored in larger amount in the thyroid. It is excreted chiefly through the kidneys, and that part excreted by way of the faeces and the skin is almost negligibly small. Estimations of the urine content of iodine have been frequently made since von Fellenberg's methods became available, and can be taken as an accurate index of the total excretion. Under the condition of a reasonably constant diet such excretion is also reasonably constant, and gives a clue to the iodine intake, there being at any rate an approximate equilibrium in the body. It has been definitely proved that the iodine excretion in non-goitrous individuals, and that therefore their iodine intake, is definitely greater than in the goitrous. Figures exemplifying this statement are given in Table II.

We can therefore reasonably draw the conclusion that there is a close relationship between deficiency of iodine in the diet and occurrence of simple endemic goitre. Our present knowledge of thyroid function permits us further to conclude that at any rate in great degree the occurrence of a simple goitre follows upon the iodine deficiency.

Baumann showed in 1895 that the thyroid gland contains iodine[3]. Oswald, in 1899, showed that much of this iodine is present combined organically as a globulin, "iodothyroglobulin"[51]. Kendall, by hydrolysis of thyroid tissue, obtained crystalline "thyroxine" in 1915, containing 65 per cent of iodine[36], and Harington in 1926[20] showed that this

TABLE I.

COMPARISON BETWEEN THE IODINE CONTENT OF FOODS IN NON-GOITROUS AND GOITROUS DISTRICTS

Country	Non-Goitrous Districts				Goitrous Districts				Ref.
	District	Incidence of Goitre	Material	Iodine per kg.	District	Incidence of Goitre	Material	Iodine per kg.	
		%		γ		%		γ	
SWITZERLAND	Canton Waadt	6 (Recruits 1875-80)	Table-salt	(Rich)	Canton Freiburg	30 (Recruits 1875-80)	Table-salt	(Nil	(30)
	La Chaux de Fonds	(Slight)	Water	1.4	Signau	(Marked)	Water	0.07	(11)
			Mangold	15			Mangold	10	
			Carrots	7			Carrots	5	
			Red cabbage	81			Red cabbage	21	
			Potatoes peeled	7			Potatoes peeled	4	
			unpeeled	18			unpeeled	11	
			Rhubarb stalks	10			Rhubarb stalks	3	
			Apple flesh	6			Apple flesh	1	
			Milk	9			Milk	3	
			Hay	47			Hay	80	
	Effingen	1.0	Rocks	5400-9200	Kaisten	61.6	Rocks	420-430	(14)
			Soil	11900			Soil	820-1970	
			Water	2.0-3.0			Water	0.5-0.8	
			Air(per c.m.)	0.5			Air(per c.m.)	0.03	
			Grass	83			Grass	78	
			Salad	34			Salad	50	
			Potatoes	31			Potatoes	35	
			Milk	276			Milk	73	
			Eggs	215			Eggs	147	
UNITED STATES OF AMERICA	Connecticut		Wheat	4	Minnesota		Wheat	1	(46)
	Maine		Wheat	9.3			Wheat	6.6	
	Connecticut		Oats	23			Oats	10	
	California		Carrots	170	Oregon		Carrots	2.3	
			Goats' milk	400	Minnesota		Skim-milk	12	
							Butter	140	
	General	0-0.5 (Recruits)	Water	0.23-184.7	General	0.5-11.1 (Recruits)	Water	0.01-0.22	
NEW ZEALAND	Auckland	0.15(Recr.) 26.3(Chldn.)	Soil	53000	Otago	1.44(Recr.) 26.6(Chldn.)	Soil	13000	
	Wellington	0.66(Recr.) 20.8(Chldn.)	Soil	48000	Canterbury	3.11(Recr.) 56.3(Chldn.)	Soil	9000	(25)
	Various		Carrot	9.5	Various		Carrot	7.7	(26)
			Grass	64			Grass	47	
			Beef	16			Beef	9.5	
			Eggs	137			Eggs	56	
			Milk(cow)	25			Milk(cow)	15	
			Milk (human)	43			Milk(human	28	
GREAT BRITAIN	Various		Water	0.06-0.42	Various		Water	0.05-0.39	(50)
NORWAY	Oslo	(nil)	Water	3090	Modum and Sandsvaar		Water	1290	(49)

COMPARISON BETWEEN THE IODINE CONTENT OF HUMAN URINE IN NON-GOITROUS AND GOITROUS DISTRICTS

TABLE II A.

Non-Goitrous Districts

Country	District	Incidence of Goitre in Children	No. of urines	Urine-Iodine		Ref.
				Extremes	Mean	
		%		γ	γ	
SWITZERLAND	Effingen	1.0	7 (non-gtrs.)	28-108	64	(14)
ITALY	Ligurian Coast	0	3 (non-gtrs.)	94-140	112	(15)
NORWAY	Vik i Sogn	0	6 (non-gtrs.)	107-240	173	(16)

TABLE II B.

Goitrous Districts

Country	District	Incidence of Goitre in Children	No. of urines	Urine-Iodine		Ref.
				Extremes	Mean	
		%		γ	γ	
SWITZERLAND	Kaisten	61.6	11 (10 gtrs. & 1 non-gtrs.	4-29	19	(14)
	Hunzenschwil	56.2	12 (10 gtrs. & 2 non-gtrs.	5-28	17	
NORWAY						
	Hostvedt	60	4	23-69	40	(42)
	Vittingfoss	55	8	14-105	48	
	Ljöterud	54	5	19-41	29	
	Meheia	54	5	10-62	39	
	Saggrenda	43	4	11-101	64	
	Komnes	40	5	13-86	48	
	Berg	39	4	6-128	56	
	Eftelot	37	5	13-86	65	
	Verp	36	5	55-140	87	
	Ruud	30	5	49-79	61	

thyroxine is a derivative of diiodotyrosine, a compound whose radical is produced when iodine acts on proteins. Harington and Barger then succeeded in synthetizing thyroxine[21], Harington and Randall have recently isolated diiodotyrosine from hydrolysed thyroid tissue[22], and Foster[17] has isolated both thyroxine and diiodotyrosine from hydrolysed iodothyroglobulin. These three compounds are the only organic compounds of iodine that have so far been isolated from animal tissue, and two of them seem to be associated only with the thyroid. Thyroxine and iodothyroglobulin are physiologically active, but diiodotyrosine is practically inert. It is usually assumed that thyroxine is the actual internal secretion of the thyroid, but final proof is still wanting, and it is quite possible that the actual secretion is somewhat more complex, a thyroxine derivative, two or three times more physiologically active than thyroxine itself.

The heat production of resting individuals (as determined by their "basal metabolism") is largely dependent upon the activity of the

thyroid; it is, of course, the summation of the heat produced by all the oxidations of all the cells of the body under certain specified resting conditions. In total absence of thyroid activity this basal heat production falls to 60 per cent of normal, so that the catalytic action of the thyroid secretion on total (basal) oxidations is usually responsible for 40 per cent of this basal heat. If thyroid be fed an animal or man the heat production is increased, and the increase is proportional to the amount fed (and the iodine content of that thyroid). The same result is produced by injecting or feeding thyroxine. Hence the physiologically active secretion of the thyroid, an organic iodine compound (thyroxine or a derivative of it), is responsible for a large proportion of the heat production of the body. It is fairly obvious, therefore, that an iodine deficiency in the diet can easily lead to such an embarrassment of thyroid function (the elaboration of an iodine-containing secretion) as to produce an abnormal condition of the gland.

It is not usefully within the scope of this paper to discuss the pathological conditions of the thyroid, concerning which pathologists and clinicians are still in some disagreement, as numerous papers given at the 1927 International Congress on Goitre well exemplify. I shall assume that in all probability Marine's conception of a physiological hypertrophy leading to a hyperplasia is the initial disturbance produced either by an iodine deficiency or by some other strain on thyroid function, and that this, if sufficiently prolonged, leads to a persistent abnormal condition termed "endemic goitre," and characterized in part by excessive colloid material in enlarged acini. Certain thyroids exhibit adenomatous areas, which are potentially dangerous, leading possibly under certain conditions to the so-called "toxic adenomata," in which a condition of the individual is produced strongly resembling, clinically, that induced experimentally in animals by feeding continuously desiccated thyroid gland, so that it resembles true hyperthyroidism. In addition there is probably the third distinct condition known as Parry's, or Graves' or Basedow's disease (naming its discoverers in order of priority), or "exophthalmic goitre," in which the thyroid is in many respects similar, histologically, to that of a toxic adenoma, but in which other clinical symptoms than those induced by thyroid feeding are manifest, so that while Marine, as a pathologist, denies the separate entity of these two latter conditions, Plummer, as a clinician, asserts it.

In Tables I and II only endemic goitre has been considered.

THE EFFECTS OF ADMINISTRATION OF IODINE COMPOUNDS IN NORMAL AND PATHOLOGICAL CONDITIONS

Before discussing the results of iodine prophylaxis in the prevention of endemic goitre it is desirable to consider the effect of iodine administration on the normal animal. And it is initially desirable to register a protest concerning the very loose phraseology so frequently employed

in clinical papers concerned with iodine treatment. Iodine, in such papers, frequently refers to Lugol's solution, a strong solution of the element iodine in potassium iodide, which is believed to contain the very active compound KI_3, and in this way to function virtually as elementary iodine. But the reference may be to tincture of iodine, a much weaker solution of the element in ethyl alcohol, or even to an iodide, or to some other compound containing iodine. The precise solution or compound that has been employed is not always easy to discover when reading such papers. Each of such solutions and compounds behaves differently in the organism.

Sodium and potassium iodide solutions circulate very rapidly in the body, the iodide ion penetrating all membranes with the greatest ease, so that within a few minutes of introduction into the stomach through a tube or within a capsule, iodide can be detected in the saliva, and very shortly thereafter in the urine also. The corresponding acid, hydriodic acid, is subsequently present in the gastric secretion, and iodide is also secreted into the milk. The main channel of excretion is through the kidneys. Of a single dose of iodide about half is excreted in the urine within 24 hours (and most of this within the first six hours), while almost all is removed by this channel within 96 hours. Iodine, present as such in the tincture, or in very active combination in Lugol's solution, rapidly attacks protein material in neutral or slightly alkaline medium. If taken after a meal it probably forms initially iodide of starch, from which the iodine is subsequently set free to attack other compounds. The final result of any reaction with protein is probably the setting free of diiodotyrosine through normal digestion. This can be absorbed, and is slowly in large part decomposed, the iodine appearing in the urine as iodide at a somewhat slower rate than after ingestion of the corresponding amount of iodide itself. Some diiodotyrosine appears to be excreted unchanged. Iodised fats, when administered, are only very slowly decomposed, the fat being laid down as are other fats; iodide is excreted, but more slowly than when other iodine compounds are administered.

The effect on the body of increasing the amount of iodine (in any one of these forms) in the circulating blood is to increase temporarily the amount present in the various tissues, although only the thyroid is capable of taking up any large store. This is done very easily, no matter in what form of combination the iodine is supplied. Thus Simpson and Hunter[56] more than doubled the iodine content of a sheep thyroid (up to 1.15 per cent dry tissue) by feeding the animal iodide, whilst sheep fed on a ration containing much sea-weed (rich in iodine) showed similar high iodine content in their thyroids.[29] Animals feeding on a diet rich in iodine (such as sea-food) show the highest figures for iodine content of their thyroids, and I found similar figures of the order of 1 per cent for dog-fish thyroids[6], and for those of a sea-duck[7].

Recently experiments have been carried out to determine what is

the effect of long-continued administration of iodine (in some one of its compounds) on the normal individual. In dosage somewhat greater than that derivable from iodized salt (U.S.A. formula) no ill effects are apparent. Hanzlik, Talbot, and Gibson[19] have shown that rats, so treated, grow faster than normal controls. Pigs are similarly affected (Evvard and Culbertson[10]). When a little iodide is fed continuously to sows during pregnancy, the litter is improved and grows more rapidly (Weiser and Zaitschek[59]). Cattle and goats give an increased yield of milk, and this milk contains more iodine (Scharrer[55]). Large continuous doses may have a deleterious effect, as Webster and Chesney found for rabbits,[58] and the effect of small dosage on the goitrous individual must be given fuller consideration later.

(The increase in growth-rate which appears to be definitely established is apparently due to a slight depressent effect of *small* dosage on metabolic activity[27, 41]. Larger dosage has the reverse effect.)

Marine has written an interesting paragraph on the unwitting use of iodine before this element was discovered.[47] "Iodine in one form or another has been used unknowingly from the earliest times in the treatment of goitre. The beneficial effect on goitre of substances now known to contain iodine is said to have been known to the Chinese fifteen centuries before Christ. Of these iodine-containing substances sponge ash is the best known, and was extensively used at the time of Hippocrates. In addition to its use by the Greeks as an important remedy in the treatment of diseases in general, Dioscorides specifically mentions the use of sponge ash in the treatment of goitre. Galen and Pliny also refer to its use.

"Humboldt in 1824 described the occurrence of endemic goitre in the United States of Colombia, and refers to the interesting fact that these people knew one salt deposit was more beneficial than another. A young French physician, Roulin, came to Colombia after graduating from the University of Paris where he had learned of Coindet's work on iodine in the treatment of goitre. He . . . . had analyses of these salts made for iodine by Boussingault and found that the deposit containing the most iodine was the one which the natives had found most useful. . . . In Mrs. Lucy Crawford's "History of the White Mountains," (1845) after referring to the frequency of swelling of the thyroid gland in Coos County, New Hampshire, at the close of the seventeenth century, she relates that her grandfather brought sea-salt, a bushel at a time, 80 miles over the mountains on his back. She states that it was generally believed by the early settlers that the swelling of the thyroid was due to the almost exclusive use of meat (deer, moose, and other game) which the nature of the country necessitated, together with the lack of salt. They noted that children were more susceptible than adults and recommended that they be given larger quantities of salt, particularly if it was impossible for them to live near the sea a part of each year."

Seven years after the isolation of the element iodine, Coindet in 1820 applied it in the treatment of goitre. In certain cases so treated, probably with heavy dosage, symptoms developed which we now associate with hyperthyroidism, leading to the century-old controversy as to the desirability or the danger of iodine prophylaxis and treatment

in goitre. Prévost of Geneva, in 1849, appears to have been the first to suggest that iodine should be administered as a preventive of goitre, and in the following decade this was tried in Switzerland, in Austria, and in Italy. The treatment was discussed before the Imperial Academy of Medicine in Paris in 1858, and criticized adversely, and finally fell into disuse, partly through the publication by Saint-Lager in 1867 of a treatise upholding the old idea that goitre is a water-borne disease.

The first systematic large-scale attempt to combat and prevent goitre was commenced by Marine and Kimball in the schools of Akron, Ohio, in 1916; in these schools 56 per cent of the girls from the fifth to the twelfth grades inclusive exhibited a visible goitre. Kimball has given a very readable account of the results.[38] Prior to these experiments with school children, Marine had remedied a serious condition of endemic goitre in the Fish Hatcheries at Shady Grove, Pennsylvania, by addition of a small amount of iodide to the water, and immediately following the publication of their results many others commenced to carry out similar treatment in schools or communities. The methods employed have not been identical and the results cannot therefore be contrasted in tabular form. Some of the most important follow:

Marine and Kimball gave every girl who volunteered for the treatment and showed a permit from her parents three grains of sodium iodide daily in drinking water for a period of two school weeks (10 days) each November and April for four years. The children of parents who refused permission afforded an ample series of controls. Of 908 girls initially non-goitrous who received the treatment, 0.2 per cent developed an enlarged thyroid; of 1,257 girls, initially non-goitrous, who remained untreated, 27.6 per cent developed an enlargement. Of 1,282 girls, who, initially, had visible goitres, 60.3 per cent were improved by the treatment, while only 13.8 exhibited improvement of 1,048 goitrous girls who remained untreated.

Klinger[39] applied the treatment in Swiss schools in which the incidence of goitre was still greater. He administered 10 to 15 mg. of iodine each week, as a mixture of iodostarin (an iodized fat) and iodide in chocolate tablets. Incidentally, of 760 children, 90 per cent were goitrous. After 15 months, re-examination of 643 showed only 28.3 still goitrous.

Eggenberger[9] reports that before the use of standard iodized salt in the Swiss district of Appenzell, at least 50 per cent of the babies of Herisau were born with a definite, palpable, visible enlargement of the thyroid gland. In the three years ending 1926, in 260 cases in which the mother had used this iodized salt before and throughout the period of pregnancy he had not seen a single congenital goitre, while in the same period the average thyroid surface in the six-year-old child had diminished from 26 sq. cm. to 7 sq. cm. (the corresponding figure for children of this age in non-goitrous regions being 5 to 6 sq. cm.).

Kimball reports[37] that the physicians of Houghton County, Michigan, doing obstetrical practice, have had experience similar to Eggenberger's, as regards congenital goitre.

Muggia (I.C.G., 459) has recorded definite beneficial results in the Italian district of Valtellina, in which medicated chocolates (containing iodide) were administered in the schools.

Wagner von Jauregg reported (I.C.G., 444) that in Vienna, after three and a half years' use of an iodized salt, the incidence of goitre in children had fallen definitely, the decrease being more marked for younger children (13.6 per cent in boys and 10.8 per cent in girls of 6 to 8 years) than in young adolescents (5.2 per cent in boys and 0.7 per cent in girls of 13 to 15 years); these results were obtained in spite of the fact that use of this iodized salt was not compulsory and cannot have affected the whole child population. At the same time he notes that there was a definite decrease in the number of adult goitres coming to operation.

Nicolaysen (I.C.G., 498) reported that of 931 school children in Sandsvaar (Norway), 45 per cent had goitre prior to treatment, while after all of these had received 1 mg. of potassium iodide weekly for 55 weeks, re-examination of 839 showed that 83 per cent were free from goitre, and 13.5 per cent showed only a slight trace of it. The initial results of a test in two schools in Christchurch, New Zealand, reported by Hercus, Benson, and Carter[25] were less good, but Jones[32] reports an experiment of Hercus, carried out at a Dunedin orphanage, in which common salt containing 8 parts of potassium iodide per million was administered for 18 months to all the children, and at the end of that period no normal children had become goitrous, while nearly 70 per cent of the pre-existing goitres showed a measurable decrease.

Keith,[33] in our own country, has reported the classical case of Pemberton Valley, B.C., in which a highly goitrous population was entirely cured and further occurrence of goitre prevented by administration of minute dosage of iodide.

Such results, taken in conjunction with the correlation shown to exist between distribution of iodine and incidence of goitre, strongly support the view that iodine lack is the cause of endemic goitre and that if such lack be remedied the goitre will not occur. Yet certain contrary, or partly contrary views, continue to be expressed, and must be mentioned. It is unnecessary to review those of the earlier observers, who dwelt mainly on such factors as geological formation and water-borne infection.

THEORIES OF THE AETIOLOGY OF GOITRE OTHER THAN LACK OF IODINE

Robert McCarrison, one of the most distinguished scientific investigators of the Indian Medical Service, is perhaps the most outstanding protagonist of a bacterial aetiological factor in endemic goitre (I.C.G.,

280)[44]. He claims, as a result of personal observations in the Himalayas, that the soil of non-goitrous regions may be rich in iodine or the reverse, while in certain goitrous regions the soil is rich in iodine. Further, that drinking water relatively rich in iodine does not prevent the occurrence of endemic goitre in the presence of a high degree of bacterial impurity, while the substitution of a bacteriologically pure for an impure water has caused the rapid and complete disappearance of the disease from a place where it had been endemic for 70 years, although the new water supply contained less iodine than the old. He claims to have induced goitre in man by administration of sediment from contaminated drinking water and to have cured it by intestinal antiseptics. He admits, however, that iodine-containing salts appear to exert a beneficial prophylaxis, and that the disease is in general more prone to arise in iodine-poor than in iodine-rich localities.

Bircher,[4] Sasaki,[54] and McCarrison all claim to have induced goitre in rats on a diet contaminated by faeces of goitrous animals while certain of their experiments suggest that when iodide is added to such a diet goitre does not develop. McCarrison quotes the work of Rosenow (1914) and of Cantero (1926) as affording evidence of the presence of specific streptococcal organisms in both colloid and adenomatous goitres. Intravenous injections of these organisms into animals cause, according to Cantero, hyperaemia and swelling of the thyroid gland without gross lesion of other organs, the organism being afterwards recoverable from the gland. Crotti (I.C.G., 342) of Columbus, Ohio, claims to have isolated from "goitrigenous waters" and also from the thyroid in cases of endemic goitre a gregarine, a spirillum, a flagellated infusorium, and a fungus, constantly present, and to have produced goitres in 50 per cent of dogs inoculated with these.

Berard and Dunet of Lyons believe that endemic goitre is the result of manifold causes, that a water-borne infection is the preponderating factor, but that physiological misery, unhealthy surroundings, and perhaps chronic digestive infections play an important part (I.C.G., 256). They consider that these act by disturbing the internal metabolism of iodine, and thus bringing about an insufficiency of that element. Galli-Valerio of Lausanne supports the theory that drinking water is the cause (I.C.G., 311). Messerli of Lausanne does not consider that it can be the sole cause and insists on the importance of intestinal stasis as a factor (I.C.G., 355). Stiner of Berne (I.C.G., 375) stresses malnutrition and the wrong preparation of food.

Repin, quoted by Roussy (I.C.G., 96) gave rats drinking water from a goitrous district and apparently induced goitre. Boiling the water did not prevent the effect but removal of lime salts did. Bircher of Aarau (I.C.G., 323) cannot accept a single aetiological factor. Pighini (I.C.G., 416) suggests that the essential causative factor may not be iodine deficiency but an intoxication leading to such a deficiency. Adlercreutz[2] considers that goitre is the result of multiple factors, and that an iodine deficiency is probably not a direct cause in Finland, since the incidence and frequency of goitre along the Finnish coast and the Bothnic sea and inner lakes is in inverse ratio to the presence of iodine.

Rhein of Strasbourg (IC.G., 417) stresses a vitamin deficiency as

the predisposing causative factor. This suggestion is of some interest, in view of McCarrison's findings that deficiency of vitamin A leads to production of Williamson and Pearce's lymph-adenoid goitre in rats,[45] and the evidence adduced by Rabinowitch[53] and by Adamson, Fraser, and Cameron[1, 18] that vitamin A or vitamin D or both have some very direct connection with thyroid-iodine function.

Keith[34] has pointed out that where goitre is prevalent in British Columbia the drinking water is murky and turbid. He found that in the Pemberton Valley with a goitre incidence of over 80 per cent (prior to iodine prophylaxis) and a very turbid and heavily-sedimented drinking water, the latter contained 108 parts of iodine per million, while Vancouver, with a goitre incidence of only 8 per cent, had a clear drinking water which was practically devoid of iodine. This led him to suggest the possibility that in such murky waters the iodine may be present in unassimilable form.

It should not be forgotten that too much stress must not be laid on the iodine content of drinking water, since the major part of the iodine we ingest is probably taken with solid food constituents, and not with drinking water.

When such varying evidence and views as those just quoted are considered, it cannot be regarded as proved that iodine-lack is the sole cause of endemic goitre; the evidence is strong that in many regions it is the major if not the sole cause, but there is also strong evidence that in certain districts a water-borne infective organism is a predisposing factor, acting possibly by lessening the absorption of the minute amount of ingested iodine that we normally consume (cf. Williamson,[60]). Nor can the possibility of an effect on iodine metabolism from vitamin deficiency be excluded. Nevertheless, it is almost universally conceded that iodine prophylaxis does lessen the incidence of goitre and benefit the majority of simple goitres, and we can at any rate agree with the principle of the Swiss Goitre Commission, as quoted by its president, Dr. Carrière (I.C.G., 26): "In adopting iodine prophylaxis the Swiss Goitre Commission did not mean to commit itself to the theory according to which thyroid hypertrophy is attributable to iodine deficiency. We have started from a merely empirical point of view, the one, namely, ... from which it is argued that a body, whose curative action on goitre is recognized, might with some reason be viewed also as a possible agent of prevention."

Accepting this dictum, it remains to consider the best method of administering iodine as a prophylactic measure, the adequate dosage, and the evidence that is available concerning the potential danger of such administration in the adenomatous goitre of adults.

(To be concluded in the November issue)

Report of the Royal Commission on Public Welfare in Ontario

THE commission appointed by Premier Ferguson, to investigate certain aspects of public welfare, consisting of P. D. Ross, Esq., Ottawa; D. M. Wright, M.P., Stratford, and Dr. J. M. McCutcheon, Chairman of the Provincial Civil Service Commission, has recently furnished the Government with a most comprehensive report. The investigations of the commissioners cover the conditions and usefulness, as judged by modern standards, of public and private hospitals, sanatoria, hospitals for the insane and defectives, penal and corrective institutions, jails and industrial farms, agencies for the care and instruction of backward and handicapped children, and a wide variety of related subjects. Their findings are presented under the following headings:

1. Introduction.
2. The general hospitals and other institutions in connection with the physical health of the people.
3. The hospitals for mental disorders.
4. The provision for dealing with mental defectives.
5. Normal child welfare and allied subjects.
6. Handicapped children.
7. The jails.
8. The reformatories and industrial schools.
9. Cost of recommendations.
10. Possible departmental organization.

Introduction

The endeavour of the commissioners was to try to indicate immediate practical steps to promote social welfare and to suggest, as a result of their investigations, general principles on which the province can best proceed with a view to the improvement of the health system. They state that the Province is badly lacking in seven important respects, namely:

1. Preventive social and health work.
2. Social follow-up work.
3. Training of social workers.
4. Provision of occupation for inmates of provincial and municipal institutions.
5. Segregation of various classes of inmates of institutions.
6. Proper inspection of the institutions maintained or assisted by the province.
7. Efficient co-ordination of the various charitable and corrective agencies.

There is, also, bad overcrowding in the majority of the provincial institutions. "Beyond question," they state, "there is great call for additional construction or extensions, also for better equipment generally for utility and occupation."

In their introductory remarks they record their conviction that sterilization of criminals and defectives who have a record of immorality should be made possible in the Province, and to this end they recommend the appointment by the Government of a judicial and medical commission to frame a suitable act for submittal to the Legislature.

GENERAL HOSPITALS

In the Province there are 113 general hospitals, 19 Red Cross outpost hospitals, six hospitals for incurables and 70 private hospitals. The commission believes that general hospitals, except as regards pay-patients, should be a complete charge upon public funds, either provincial or municipal. General hospitals receive at present for indigent patients a grant of 60 cents per patient per day from the province, and $1.75 per patient per day from the municipality. As a result, some general hospitals receive too small an amount to meet their needs.

The report deals in detail with this problem and offers the following recommendations:

"That legislation provide that the cost of non-pay patients in general hospitals be met fully by public money on the basis of one-fourth by the government and three-fourths by the municipalities from which the patients come, which is about the present proportion. If a system of this nature were adopted, public grants to hospitals would vary in almost all cases, but each hospital would get justice. So would the Province and each municipality."

The Commission emphasizes the desirability of reduced hospital costs to various classes of non-pay patients and recommend:

"1. That hospitals be asked to furnish four types of hospital accommodation:

I—Public wards (for non-pay patients).
II—Semi-public wards.
III—Semi-private wards.
IV—Private wards.

"2. That public wards be reserved for the use of non-pay patients only.

"3. That semi-public wards be reserved for patients of limited means, desiring to pay their way, and at a cost not exceeding the cost per day which a hospital charges for a public ward patient; and which cost shall include all charges for special treatment or so-called extras.

"4. That semi-private wards be reserved for patients not prepared to pay the cost of private wards, but willing to pay a rate not exceeding one dollar ($1.00) per day in excess of the charges for semi-public ward treatment.

"5. That in the event of patients applying for hospital accommodation in public, semi-public or semi-private wards, and the accommodation in such wards being fully occupied, the hospital should furnish equal or superior accommodation in other sections of the hospital at the same rate.

"6. That private wards be available for patients of means at a range of rates suitable to the demands of the community.

"7. That hospitals be asked to furnish, if desired, special graduate or trained nurses for patients in classes II and III, at the rate at which the hospitals pay for permanent staff nurses.

"8. That hospitals be prepared to furnish, on a group basis, graduate nurses for patients in classes II and III when they are desirous of sharing the services of such nurses."

The commissioners point out that it should not be supposed that the general hospitals in any case are going to be disproportionately supported by public money. The support comes chiefly from pay-patients. Last year, the hospitals' revenue was $10,140,782. The government grant came to $932,088 of that; the municipal grants to $1,565,942.

This section of the report deals also with other hospital matters such as troublesome residence clause, the nursing dentistry and X-ray charges, home for incurables, and private hospitals. The following recommendations are made:

That provincial and municipal grants should be payable in the case of infants as well as of adults.

That steps should be taken to lessen the cost of nursing and of X-ray treatment in case of pay patients.

That the hospitals should be required to pay more attention to dentistry.

That social service departments be established in hospitals.

Cancer Treatment

After presenting in detail the urgent needs, recommendation is made that a special conference of medical men be convened to discuss the problem and that the establishment of a provincial cancer hospital, fully equipped, and purchase of a radium supply by the Province be undertaken.

Sanatoria for Tuberculosis

At present there are ten sanatoria in Ontario receiving public aid. The commissioners hold that these should be treated in the same way as general hospitals as regards public grants. Further, that the Government should meet half the cost of any new sanatorium or of additions to existing ones. Emphasis is laid on the need of preventive clinics. Provision for occupational training for convalescents and aid in re-establishment upon discharge is recommended in the report.

A recommendation relating to venereal disease treatment which will call forth much discussion is expressed thus: "Neither general hospitals nor sanatoria should be required to admit patients having venereal disease. These should go to isolation hospitals."

Departmental Supervision

The Commission respectfully suggests that it would be desirable to

have the supervision of hospitals and of all physical health in the Province concentrated in the Department of Health.

MENTAL HOSPITALS

Ontario has nine hospitals for mental disorders, as well as a hospital for the criminal insane and one for epileptics, the Toronto Psychiatric Hospital, and the Orillia Hospital for defectives. A series of eighteen recommendations are submitted dealing with the needs for new buildings in different localities; the value of the cottage and block system for new buildings; the need of a government-owned and operated psychiatric hospital. They also recommend that two or three of the larger mental hospitals or some of the general hospitals should have special wards for alcoholics and drug addicts.

CHILD WELFARE

The needs of the mentally defective children and of the crippled and otherwise handicapped children have been carefully investigated by the Commission and their recommendations make provision for a great improvement in the facilities for their care. Among the recommendations concerning mental defectives are:—

(*a*) The requirements that school boards in populous centres must have auxiliary classes for such children with trained social workers.

(*b*) That the Province should provide two vocational schools, one in the east and one in the west of the Province, each to accommodate 1,000 to 1,200 children capable of being trained, for children living in districts where no classes are available.

(*c*) Maintenance of clinics with trained social workers by the provincial mental hospitals and vocational schools.

(*d*) Sterilization of immoral defectives.

In reference to handicapped children they state that according to estimates obtained by the commissioners from sources which they believe to be well-informed, there are in Ontario, from 6,000 to 7,000 crippled children, 2,000 blind persons, and 3,000 deaf or dumb persons. To meet the needs adequately the commissioners recommend the division of the Province into ten districts (which they specify) with a trained graduate nurse or social worker operating in each district under supervision of a special government officer, to help in every possible way, the later objective being the provision of a sufficient number of institutional schools to meet the needs.

Normal Child Welfare

A large section of the report is given to the consideration of the welfare of children unfortunate in their circumstances, but neither defective nor physically handicapped. This is chiefly the matter of the Children's Aid Societies, of which there are 56 in Ontario with over 20,000 children under supervision.

"The Children's Aid Society," says the report, "is one of the most valuable of all our social agencies. . . . . The societies are of infinite value to the province because of the extent to which, in child service, they combine private benevolence with government power."

At present certain small grants are made by the Government to assist in meeting the salaries of executive officers of such societies. The commissioners state that, to ensure obtaining competent officers, this plan should be changed, and that instead, the Province should pay the salaries of the executive officers, placing these officers on a civil service basis, thus providing superannuation. To aid the funds of the societies, the commissioners suggest that a provincial tag-day might be desirable.

They condemn both the present Unmarried Parents' Act and the practice of making the Children's Aid Societies vehicles for enforcement of the act.

CORRECTIVE INSTITUTIONS

The balance of the report dealing with corrective institutions contain a condemnation of all provincial jails with the Toronto jail cited as a glaring example. They are "inferior in every sense of the word." Overcrowding, antiquated facilities, lack of segregation of different classes of prisoners, idleness of prisoners supposed to labour under the prison law, poor food and understaffing with poorly paid men are some of the evils presented.

The report deals also with the conditions found in the thirteen reformatories and industrial schools.

COST OF RECOMMENDATIONS

"Can Ontario afford such an expenditure as is suggested?" The answer is quite definitely in the affirmative. It is suggested that a hospital tax might be levied in hotel and restaurant meal prices and that the net proceeds be used for hospitals. The tax suggested is five per cent of the cost of all meals over one dollar each. In Quebec, the revenue from a similar tax amounts to approximately $600,000 annually.

THE DEPARTMENT OF PUBLIC WELFARE

The concluding recommendation of the report is for the creation of a department of public welfare to be presided over by a Minister of the Cabinet with a deputy minister and staff. Under this department the Commission would place the supervision of all mental hygiene, hospitals for mental disorders, schools for defectives, child welfare, adult relief, old age pensions, refuges, poor houses, mothers' allowances, soldiers' aid, corrective institutions, juvenile courts, etc.

The report consists of 150 papers with an appendix of several hundred pages. Copies may be obtained on request by addressing Dr. J. M. McCutcheon, Provincial Civil Service Commission, Parliament

Buildings, Toronto, Ont. The total cost of the Commission's study was $5,117. The commissioners did not receive salary. Tribute is paid by the commissioners to the efficient work of the secretary, Mr. W. G. Frisby.

THE GOVERNMENT AND THE REPORT

In connection with the Royal Commissioners' Report, the JOURNAL has pleasure in stating that a number of the most important recommendations have been implemented already. It should not be forgotten that the Government, prior to the appointment of the Commission, had already authorized large expenditures on capital accounts to permit of new buildings. In connection with the Orillia Hospital for defectives, buildings costing $800,000, permitting of increasing accommodation and proper segregation, are nearing completion. Accommodation for epileptics at Woodstock is being doubled at an expenditure of $500,000. Over $750,000 is being spent on the reconstruction of the mental hospital at London and a building is being provided to accommodate the criminally insane who are now housed in crowded quarters at the Ontario reformatory at Guelph. New nurses' residences are being undertaken for the institutions at Brockville and at Mimico. A system of clinics as recommended in the report, dealing with the needs of mental hygiene, has already been established. At the present time four clinics are working in co-operation with the provincial mental hospitals. It is hoped by the end of the year the number will be increased to ten, thus serving the whole province. The purpose is to give advice and treatment to children and adults who give indications of mental and physical defects, and to teach parents and relatives how to care for and supervise at home many of the cases that now find their way to public institutions.

Following the publication of the report, Premier Ferguson announced the creation of a Department of Public Welfare and the appointment of the Honourable W. G. Martin as Minister. As recommended in the report, all hospital supervision has been transferred from the Provincial Secretary's Department to the Department of Health under the Honourable Dr. J. M. Robb. Juvenile institutions such as the Bowmanville school for boys, formerly under the Provincial Secretary's Department, have been placed under the Department of Public Welfare. A recent announcement intimates that a cancer institute will be established in the near future, providing facilities not only for treatment but also for research.

The Ross report is an exhaustive study and the Government has expressed its heartiest appreciation of the work of the commissioners. There is every reason to believe that the good results already achieved will continue to be recorded.

Nutrition and Pregnancy*

KENNEDY C. McILWRAITH, M.B.

Associate Professor of Obstetrics, University of Toronto, and Senior Obstetrician to the Burnside Hospital

THIS paper does not contain a recondite study of food values, but rather a collection of observations on conditions found in practice. Physiologically pregnancy stimulates the growth of the entire sexual system to an extraordinary extent, and fat accumulates superficially, so that some increase in weight occurs apart from the growth of the foetus and accumulation of liquor amnii. For this an active and efficient metabolism is needed. Only too often pathological phenomena intervene. The first of these to appear is the *nausea and vomiting of pregnancy*. It begins about the sixth week or earlier and usually ceases at the end of the third month, but may continue throughout the pregnancy. It is a complex phenomenon, its main items being neurosis, acidosis, dehydration and evidence of liver damage shown by the persistent presence of urobilin in the urine. When the stomach will retain any food, the condition is met best by the avoidance of acid and fatty foods, and the taking of carbohydrates with an abundance of water. When the stomach rejects everything the same end is achieved by the rectal administration of glucose and normal saline, or better by intravenous administration of glucose solution.

The next common pathological phenomenon to appear is one comprehensively referred to as *eclamptic toxaemia*. Its premonitory signs are oedema, high blood pressure, and albuminuria. It comes on from the fifth month or earlier, and persists to the end of pregnancy. If severe, its effects may be, and often are, permanent. This also is a complex phenomenon. It occurs most frequently in the changeable seasons of autumn and spring, and throughout the cold winter season. In many patients it is the effect of pregnancy on pre-existing nephritis or hypothyroidism. Professor Harding's work in the metabolic ward of the Burnside has shown that it is to a large extent a disturbance of the water balance and due to an excess of sodium chloride in the food. The fresh vegetables, fresh fish, fresh meat of summer abate the evil. Great benefit also follows the elimination of salt from the food either partially or entirely. Consider for a moment how largely Canadian food is salted—salt bacon, salt pork, salt beef, salt fish, salted biscuits, salted nuts, salt olives, and the free use of salt as a condiment. A knowledge of this fact enables us to avoid the protein starvation that

*Presented at the Public Health Nursing Section, 19th Annual Meeting of the Canadian Public Health Association, Toronto, May, 1930.

we used to prescribe, and give our patients nutritious, though perhaps not very appetizing food.

The question of *anaemia in pregnancy* has attracted the attention of our clinic this winter. The extent of it may be judged by the following figures:

> Haemaglobin on admission to first stage room.
>
> Estimation made on 68 patients gave an average of 60 per cent. Of these 38 were below 60 and 30 above. The highest was 84 per cent and the lowest 21 per cent. Some of these patients had been under treatment for anaemia and were lower when first seen.
>
> Post-partum, 157 estimations were made during January, February, March, April and May on all who "looked pale." The average was 45 per cent. This included some patients who were admitted after severe haemorrhage and does not, therefore, show the actual blood condition due to pregnancy. Had all the patients been included, the percentage of haemaglobin would have been higher. But it is surely bad enough.

These are post-partum figures chiefly, but preliminary reports from our out-patient clinics are almost as bad. We do not find it so prevalent amongst our private patients. Many causes are at work here, too—the short days and few hours of sunshine in the winter, and the effect of the severe climate confining people more closely to quarters, often inadequate, are partly responsible; but we find evidence that inappropriate nourishment, and in some cases lack of sufficient nourishment of any kind, also play a part.

We meet the condition by the administration of iron by mouth or by hypodermic injection, and in urgent cases by blood transfusion.

A special diet list for anaemia has been prepared by the hospital dietitians, and I give it here:

Meats—Glandular organs, as liver, kidney and heart are especially valuable and should be included frequently. Muscle meat also,—dark meat is preferred to white meat.

Eggs—At least one egg a day.

Fruits—Some of the following daily:—Apricots, bananas, plums, prunes, raisins, currants, figs, dates, oranges, apples, peaches.

Vegetables—The leafy vegetables, such as lettuce, cabbage, etc., should be used freely. Spinach, tops of beets and turnips, grated raw carrots and beets may be added to the salad. Potatoes, lima beans and dry beans are good.

Bread and cereals—Use more whole wheat breads and cereals. Flours and cereals made of entire grain are better than refined products. Bran may be used as a cereal or added to bread, etc.

Dairy products—Milk, as much as possible, alone and in cream soups, puddings, etc., and as cheese. Butter should be given freely.

Miscellaneous foods—Oysters, almonds, walnuts, tapioca, molasses and maple sugar.

Certain general conditions may now be referred to.

Owing to the large size of the uterus from the sixth month to the end of pregnancy, the other abdominal viscera are crowded. *Constipation* often results, and the stomach will not contain a large meal with comfort. During these months, therefore, the woman should take, say four light meals a day, rather than two light and one heavy one; should not take a heavy meal late in the day nor lie down immediately after any meal.

No special effect of a milk diet during pregnancy in *increasing lactation* can be shown. It is only effective when it improves general nutrition. During the nursing period, also, the urging of much milk and fluid on the patient fattens her more than it increases her breast milk.

It remains only for me to refer to the *importance of fresh air and sleep* and I have finished my recommendations; but I must not miss the opportunity of calling the attention of this gathering to the manner in which the forces of the enemy are massed against our women in winter. The defence is weakened especially in the winter by pernicious vomiting toxaemia, pre-eclamptic toxaemia and anaemia and at the same season the haemolytic streptococcus is especially present. Seventy-five per cent of our *streptococcic infections* at the Burnside during a period of seven years occurred in the months of February, March, April and May and the period exactly corresponds with the prevalence of scarlet fever and erysipelas. In an analysis of our cases, Dr. W. A. Dafoe, Fellow in Obstetrics and Gynaecology, University of Toronto, showed fourteen cases in which the streptococcus was present in the cervix uteri before confinement, but only seven of these developed infection post-patrum. The immunity of the other seven was the general immunity of health, and no single factor is of greater importance than the condition of the blood. If the conditions found at the Burnside be any indication of the general blood condition of the poorer classes during the winter, then one factor, at all events, in the high provincial death rate from septicaemia has been disclosed.

A World Panorama of Health Education

"TO promote the quality of health work in the schools of the world by making available to the leaders in each country a knowledge of the activities and progress in other countries." Such is the purpose of the Health Section of the World Federation of Education Associations. The proceedings are presented in a volume of 256 pages just published by the American Child Health Association and the Metropolitan Life Insurance Company. Copies may be had without charge by addressing either body.

Editorials

MENTAL HEALTH AS A COMMUNITY FACTOR

MENTAL disorders are responsible for an enormous drain upon human happiness and efficiency. Persons suffering from tuberculosis or cancer can often carry on their own affairs until very near the end, but those afflicted with mental disease in its advanced stages are, in the majority of cases, a total liability to the community. Furthermore, they are usually longlived and the cost of their keep frequently runs to enormous totals. But this is not the whole cost to the community of mental disability: to this we must add the loss of efficiency, the accidents, the wasted effort, caused by the thousands of people with whom the average person never associates the thought of mental disorder, but who, nevertheless, are the victims of mental maladjustment in some form or other.

According to figures compiled in the State of New York—and Canadian experience seems to bear them out—one person out of every twenty-two in the community will suffer from a mental breakdown of sufficient seriousness to warrant his or her removal to a mental hospital; of the children now attending school a greater number will, as adults, enter mental hospitals than will graduate from college; and while only a portion of those needing treatment are now being cared for, there are almost as many occupied beds in Canadian mental hospitals as there are in all the general hospitals combined.

Mental health can be described as the proper adjustment of an individual to his environment; that is to say, his attitude towards his occupational, sex, and social relationships. Failure in any of these essentials often leads to mental disturbance more or less serious in its consequences. How, then, can these unfortunate results be avoided? How far can a community-directed mental hygiene programme be brought to bear upon what are so obviously individual attitudes?

A comprehensive public health programme in the physical field must begin with the individual at infancy—and even during the prenatal state—if its full value is to become effective. Diet during the growing years is most important; attention must be paid to teeth, tonsils, etc. Early attention to these matters is amply justified by results in later life, but it is of even greater importance that the emotional and intellectual development of the child be likewise properly directed. Most people devote some time to vocational preparation; very few would think it possible to do justice to a trade or profession without some sort of special training. Yet when it comes to the ex-

tremely important function of parenthood, most persons either feel themselves adequately equipped or seem to believe that with the coming of children there will also come in some mysterious manner the knowledge of how properly to care for them. Perhaps in a simple community setting what we may call the native intelligence of parents might suffice; but our civilization is becoming too complex, and it is now necessary that the profession of parenthood be learned like any other.

A number of useful books for parents have appeared in recent years, and at the University of Toronto and at McGill University, classes in parent education have been organized, but they can obviously serve only an infinitesimal fraction of the community. Furthermore, they are designed for demonstration rather than for actual service. Assuming, however, these agencies to have multiplied to such an extent as to allow all parents to receive instruction sufficient to render them less a menace to their offspring, the child must still run the gauntlet of the schools. So great is the resiliency, the capacity for adjustment, of the average person that most of us survive without permanent harm this successive impingement of parents and teachers, but there is a definite percentage who do not. These become the truants, the delinquents, the misfits, who eventually help to fill our jails, hospitals, and other public institutions.

Obviously the time to deal with these anti-social manifestations is at the beginning. Consequently, there should be attached to each school a clinic staffed by a specially trained personnel whose duty it would be to investigate the causes underlying all cases of deviation from the normal, and to apply in each case the remedy suggested by the circumstances. One such clinic, maintained as a research unit by the Canadian National Committee for Mental Hygiene, at a Toronto grade school during the past five years, seems so far to justify the hope that through similar agencies emotional disturbances of a more serious nature in later life may be avoided.

There should also be in each community a number of out-patient clinics for the treatment and advice of persons suffering from what are commonly called "nervous disorders," "nervous breakdowns," etc.,—a place where persons afflicted with morbid fears, lack of security, feelings of failure, depression or undue excitement might be able to go for expert advice. In this regard the recently adopted programme of the Ontario Government under the direction of Dr. B. T. McGhie, which provides for the organization of mental hygiene clinics in the principal centres throughout the province, is a most hopeful sign of progress.

There is one more essential,—the public attitude towards mental disability must undergo a radical change; the stigma associated in most minds with mental disease must give place to a more intelligent recognition of the fact that a mental breakdown is no more an occasion for shame than is an attack of rheumatism or pneumonia.

THE HONOURABLE DR. JOHN M. ROBB,
Minister of Health, Ontario

The Honourable Dr. John M. Robb was born in Perth County near the city of Stratford, in 1876. He graduated from the Faculty of Medicine, University of Toronto. After extensive postgraduate studies in New York city he commenced his practice at Blind River, Ontario, where he has made his home until the time of his new appointment as Minister of Health. He has been an ardent advocate of all that pertains to the advancement of the district in which he has been resident. For fifteen years he has served as Medical Officer of Health, bringing to this office an unfailing interest in the practice of preventive medicine. He entered the provincial legislature in 1915, representing the district of Algoma, until 1919 and again from 1926 to the present.

THE BANTING INSTITUTE
University of Toronto

In the new Banting Institute the University of Toronto possesses one of the outstanding institutes in the world for medical teaching and research. The building, costing $900,000, is situated on College street, directly opposite the Toronto General Hospital, with which it is connected by an underground tunnel.

BANTING INSTITUTE, UNIVERSITY OF TORONTO

The epoch-making discovery of insulin has been memorialized in naming the institute which provides adequate facilities for the Banting and Best Chair of Medical Research, and gives to Dr. Banting and his associates the facilities which are so essential in conducting original investigations. The entire fifth floor of the Institute is used to accommodate this department. The Department of Pathological Chemistry, with teaching and research laboratories, occupies the fourth floor; the third floor accommodates the clinical and special research laboratories of the departments of surgery, medicine, obstetrics and gynaecology; the second floor, the ground floor and basement are devoted to pathology and bacteriology. The needs for teaching have been fully provided and the incoming classes of medical students will find facilities equal to the best to be found in any part of the world.

Many distinguished physicians and surgeons of this continent and of Great Britain honoured with their attendance the occasion of the formal opening of the Institute on September 16th. The opening ceremonies were held in Convocation Hall where a masterly address

was delivered by Lord Moynihan, President of the Royal College of Surgeons, England. Following his address, Lord Moynihan unveiled a portrait of the late Lord Lister presented to the Institute by the late Dr. F. LeM. Grassett and Dr. H. St. G. Baldwin, former house-surgeons to Lord Lister. The portrait has been placed in the library over the fireplace into which is incorporated a brick from the Glasgow Infirmary, presented by Prof. I. H. Cameron, F.R.S.C. At a special convocation in the afternoon, the honorary degree of LL.D. was conferred upon Lord Moynihan; Dr. T. S. Cullen, Johns Hopkins University; and Charles S. Blackwell, Esq., Chairman of the Board of Trustees, Toronto General Hospital. Dr. Davidson Black, Peiping Union Medical College, China, received the degree of D.Sc. in absentia.

SASKATCHEWAN HEALTH OFFICIALS' ASSOCIATION

FIFTH ANNUAL CONVENTION, HOTEL SASKATCHEWAN, REGINA

Wednesday and Thursday, October 15th and 16th, 1930

Wednesday, October 15th

9.00 a.m.—*Registration.*

Welcome by His Worship Mayor James McAra, Regina.

President's Address—Dr. W. R. Coles, Medical Health Officer, Regina.

Public Health Nursing in Saskatchewan—Miss Ruby Simpson, Director of Nursing Services, Department of Public Health.

Discussion led by Dr. R. G. Ferguson, Director of Medical Services, Saskatchewan Anti-Tuberculosis League.

Health Problems Amongst the New Canadians—Dr. A. O. Rose, M.H.O., Hafford, Sask.

Discussion led by Dr. O. A. Turner, of Theodore, and Dr. W. E. Somers of Foam Lake.

The City Health Inspector—Mr. Ronald Gilbert, City Health Department, Prince Albert.

Discussion led by Mr. A. Roberts, City Health Department, Regina.

2.00 p.m.—*Visit* to Saskatchewan Co-operative Creameries and P. Burns Co., Ltd.

6.15 p.m.—*Dinner*—Address by Hon. F. D. Munroe, M.D., Minister of Public Health.

Thursday, October 16th

9.30 a.m.—*Round Table Conference*—Conducted by Dr. Arthur Wilson, Medical Health Officer, Saskatoon.

Subjects under discussion will include: Tuberculin Testing of Dairy Cows; The Cancer Problem; Medical Examination of Restaurant Employees; Vital Statistics; The Rat as a Menace to Health; Problems of the Part Time Health Officer.

2.00 p.m.—*Round Table Conference* (continued).

Business Meeting and Election of Officers.

LABORATORY SECTION

G. B. Reed, Ph.D., and A. L. McNabb, B.V.Sc.

THE STATUS OF THE A.P.H.A. STANDARD METHODS OF MILK ANALYSIS IN CANADA

C. K. Johns
Division of Bacteriology, Central Experimental Farm, Ottawa.

A SHORT time ago, the editor of a dairy trade journal pointed out to the writer that there were no standard methods of milk analysis in Canada which were officially recognized in the same sense as the A.P.H.A. Standard Methods of Milk Analysis are recognized in the United States. It was further stated that the methods of interpreting bacterial counts of milk in Canada were in a chaotic state, possibly on account of this lack of official methods. While the present writer could scarcely subscribe to the latter belief, he was nevertheless sufficiently interested to address letters to the directors of twenty-four provincial and municipal laboratories throughout Canada, with the object of discovering (a) whether the A.P.H.A. Standard Methods were being followed, and (b) whether the official recognition of these Standard Methods was favoured. To date, replies have been received from twelve laboratories; each of these states that the Standard Methods of the A.P.H.A. are being followed, while the four laboratories definitely expressing an opinion are all in favour of the official recognition of these Standard Methods in Canada.

The attitude of directors of public health laboratories is perhaps best indicated by the following quotations from replies received to date:

"Although we have not officially recognized the A.P.H.A. Standard Methods for use in this Province, we have adopted these methods for our own use and always recommend them to other laboratories. In consequence I believe these standard methods are very generally used in this Province . . . I am of the opinion that the adoption of the A.P.H.A. methods as official standards throughout Canada would prove a distinct advantage in the milk control work of the laboratories in the Dominion."

"The technique here for the past seven years is that laid down in the last edition of the A.P.H.A. Standard Methods of Milk Analysis. Personally I see no reason why this procedure for milk and cream, and also for water and various other routine examinations, should not be followed in Canada as well as in the United States."

"We have used the Standard Methods of the A.P.H.A. for both Water Analysis and Milk Analysis in this laboratory for the last 18 years. Inasmuch as the A.P.H.A. is an international organization whose membership includes all of the prominent public health workers of both the United States and Canada, as well as a smaller membership from some other countries, we have considered the Standard Methods of the A.P.H.A. as equally applicable to both countries."

"I am fully in accord with your idea that we do not need a separate set of standard methods in Canada for milk analysis.—The American Public Health Association originated as an international association and I have no information that its international status has been changed so far

as Canada is concerned. Canadians have acted as president and in other official capacities and the Association has met in Canada a number of times to my personal knowledge."

"The bacteriological methods of the A.P.H.A. are followed in this laboratory.—We have every reason for confidence in the AP.H.A. methods but we would offer the suggestion that something in the nature of a Canadian committee be formed for the purpose of studying the dairying problems peculiar to Canada."

If one can judge by the opinions expressed above, the attitude towards the official recognition of these Standard Methods in Canada is most favourable. Indeed, the fact that every laboratory heard from reports that they are following the A.P.H.A. Standard Methods would appear to indicate that the suitability of these methods to Canadian conditions is beyond question. While there may be something to be said in favour of a distinctively Canadian "Standard Methods", it is extremely doubtful whether this matter has received sufficient experimental study to justify departing from the A.P.H.A. Standard Methods, which are based upon a considerable amount of experimental evidence. The other alternative, that of adopting the latter, and relabelling them "Canadian", is scarcely likely to find supporters. Even were it possible to devise methods which were more suitable to Canadian conditions, it seems to the writer that the loss arising from inability to compare results between laboratories in the two countries would outweigh any slight gain from the use of distinctively Canadian methods.

Since the Canadian Public Health Association would appear to be the logical body to extend official recognition to the A.P.H.A. Standard Methods in Canada, it was suggested that this question might well be brought to the attention of the membership, in order that ample time might be given for complete discussion before the matter is brought up for attention at the next meeting.

REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES IN CANADA* BY PROVINCES—AUGUST, 1930

Diseases	P.E.I.	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Cerebrospinal Meningitis	—	—	1	2	27	—	1	1	1
Diphtheria	1	14	17	96	225	35	20	29	15
German Measles	—	—	—	—	14	†	10	1	4
Anterior Poliomyelitis	—	2	—	4	175	5	18	54	3
Measles	—	4	1	18	201	33	89	9	42
Mumps	—	1	—	14	28	25	3	4	10
Scarlet Fever	—	23	24	138	182	23	16	25	35
Smallpox	—	—	—	3	22	1	8	1	6
Typhoid Fever	2	1	22	104	71	9	7	8	16
Whooping Cough	—	7	—	137	367	72	96	30	178

*Data furnished by the Dominion Bureau of Statistics, Ottawa.
†Not reportable.

PUBLIC HEALTH NURSING

RUBY M. SIMPSON, Reg.N., and FLORENCE H. M. EMORY, Reg.N.

HOME NURSING IN NEW BRUNSWICK

SIBELLA A. BARRINGTON*

ARE Home Nursing classes worth holding? Are they worth the expense and time they will cost? Looking back over the year, the answer can be given, most emphatically; Yes, a hundredfold more than either the money or time given to them. Case after case comes to mind: of baby lives saved; grown-ups tenderly nursed by their own people, following the teaching of home nursing. These cases in mind are all in districts far from nursing aid, with oftentimes many miles between the patient and the nearest doctor. In many instances it has been the doctor who has told me the story of the wonderful help he has received from women who had learned home nursing and put it into practice in their own homes.

Living in cities where the best of medical and nursing care is available, one is not aware of conditions under which a very large proportion of our citizens live; of the long cold drives in winter which have to be taken to fetch the nearest doctor when illness comes; of the helpless feeling when the doctor goes, leaving orders that seem so hard to carry out. Thanks to Home Nursing classes, there are now in many communities groups of people (sometimes very small groups, perhaps), who know just what to do when the doctor gives his orders. He feels happier in leaving the patient, and the family feel someone is near who can carry out instructions, make a bed properly, change sheets without disturbing the patient, give simple treatments in a practical way, and from that district goes out a real thanksgiving for Home Nursing classes.

The effect on the health of the communities where classes have been taught is really noticeable. One story will show what I mean. In a country train one day, I fell into conversation with a woman who began talking home nursing to me. "I am just going home from a visit to my sister," said she. "While there I attended a meeting, and really they talked of nothing but how ill they had all been during the past winter, colds, pneumonia, etc. I listened to them for some time, at last one of them said to me, 'I suppose you had the same sort of winter in your community; of course, you are all weak and run down from the colds, too'. No, we did not have them, I told her, we were well, except for a few colds which did not spread. You see, we heard about the Home Nursing classes last year and determined to have them if possible. The nurse taught us many things, but she laid great stress on the fact that colds were 'catching', and when one of us got one, to stay away from the neighbours; to be sure, no one used the cup or spoons we used without washing or boiling; to cover

*It is with great regret that the Journal records the recent death of Mrs. Barrington.

our mouth and nose when coughing and sneezing. We did as she told us and prevented disease. She also told us to talk and think health, not illness, if we wished to make our homes cheerful and healthy. I told them they had better have a Home Nursing class before next winter."

That one woman's story made me realize that, in New Brunswick at least, the time and money had been well spent. The knowledge given those women helped not only themselves, but all who came in contact with them. Babies' lives have been saved, and children are better fed and cared for through instruction given and literature distributed.

It seemed to me that in remote country districts where doctors and nurses could not make a living, home nursing classes are one of the big factors to be considered in public health work. Is it not wise to teach the people prevention of disease, how to render first-aid and to make patients comfortable, if accidents or illness occur? This is a very sure way of teaching people the true meaning of public health, for is it not after all individual health that makes for the general health of a community? Giving unto our neighbours what we would have them give to us, kindness, love, help to prevent illness!

NEWS AND COMMENTS

P. A. T. SNEATH, M.D., D.P.H.

Public Health Education in China

DR. WALLACE CRAWFORD, D.P.H., who spent his last furlough in London, Ont., is now at Chengtu, Szechwan, West China, where he is Director of the West China Council on Health Education. Dr. Crawford recently forwarded to us two very striking letter-size publications in Chinese, which he informs us are headed, "Thirteen Rules of Health", and "Flies Kill People". The Council have planned to publish a different tract of this character for each month of 1930 for circulation amongst the vast number of inhabitants of this area. Western methods of public health education are not slow to reach even this distant region of the rapidly advancing country of China.

Canadians at Fort Worth, Texas

AT the coming meeting of the American Public Health Association, Fort Worth, Texas, several Canadians will take part in the programme. Dr. John T. Phair, as chairman, will give the opening paper in the section of child hygiene. A symposium on public health and the practitioner has been arranged for one of the general sessions to which Dr. Gordon Bates will contribute an important paper. In the section of industrial hygiene Dr. A. Grant Cunningham, who is returning from attending the international conference on silicosis at Johannesburg, South Africa, will speak on the subject of industrial hygiene in South Africa.

Ontario Hospital Association

AT the closing meetings of the Ontario Hospital Association Dr. John Ferguson of Toronto was elected President of the association, to replace R. H. Cameron of Toronto, who becomes Honorary President. Other officers elected were: Colonel H. R. Casgrain of Windsor, First Vice-President, and Fraser Armstrong,

Second Vice-President. Dr. Fred W. Routley of Toronto remains Secretary-Treasurer.

British Columbia

THE Journal learns that Dr. F. T. Underhill, D. P. H., Medical Officer of Health for the city of Vancouver is planning to retire at the end of this year after many years of the most valuable service to the city in this office.

Dr. F. C. Bell who has been seriously ill has resigned as medical superintendent of the Vancouver General Hospital. Applications are being received by the hospital to fill the vacancy.

Publication of a notice calling for applications for the position of Medical Officer of Health for Vancouver has been made by the city of Vancouver. Applications for this position are to be received by October 10th, 1930.

The Pacific Science Congress meets in Vancouver and Victoria in the autumn of 1932. Scientific matters will be discussed of direct interest to all countries (particularly to Canada) bordering on the Pacific, including Public Health. The sectional committee on Hygiene and Public Health has been appointed and consists of the following:—Dr. Jno. A. Amyot, C.M.G., Deputy Minister of Pensions and National Health of Ottawa, Ont.; Dr. H. E. Young, Provincial Health Officer of British Columbia; Dr F. T. Underhill, Medical Officer of Health of Vancouver, B.C.; Dr. N. MacL. Harris, Director of Laboratories, Dept. of Pensions and National Health, and Dr. H. W. Hill, Professor of Bacteriology, and of Nursing and Health, of the University of British Columbia, who is chairman of the committee.

Alberta

FULL-TIME units are now being established in Red Deer and the High River District.

Dr. Charles A. Barager who for the past ten years has been Medical Superintendent of the Brandon Hospital for Mental Diseases, Brandon, Manitoba, has accepted the post of provincial physchiatrist for the province of Alberta, and will shortly enter upon his duties.

Manitoba

WE have to note an error in these columns in our last issue. The resignation of Dr. T. A. Pincock as Deputy Minister of Health does not become effective until the 15th of November next when he will become Superintendent of the Brandon Mental Hospital and will be succeeded by Dr. F. W. Jackson, D.P.H. at present Director of the Division of Disease Prevention.

The programme of toxoid immunization against diphtheria sponsored by the Department of Health and Public Welfare has met with splendid results. To date some 57 municipalities have either completed the immunization of the children within their purview, or are so engaged. This will mean by the onset of winter approximately 20,000 rural children will have been immunized. This campaign has been made possible by the assumption of the financial obligations on the part of the individual municipalities by an increase in tax rate, so relieving a direct charge for this important service. The response on the part of the parents has been decidedly remarkable. Fully 95 per cent of the school children in the various municipalities undertaking the campaign having presented themselves for immunization and in many instances a large percentage of the pre-school group have also been included. It is expected that by the first of the coming year over one-third of the municipalities of the province will have fully protected their school-age population against the ravages of diphtheria.

Ontario

ON the afternoon of September 26th last, the Hon. J. D. Monteith, Provincial Secretary, officiated at the opening of a new wing to the Niagara Falls General Hospital, costing $112,000 and providing for additional bed accommodation to the number of sixty-two, two public wards, children's ward, infant's clinic, maternity ward and an eighteen-bed nursery.

New Brunswick

FOLLOWING the resignation of Dr. H. A. Farris as Superintendent of the Saint John Tuberculosis Hospital, Dr. R. J. Collins, formerly Superintendent of River Glade Sanatorium, has been appointed.

Prince Edward Island

MISS DOROTHY McKENNA has been appointed to the staff of the Red Cross Society of Charlottetown from August 1st, 1930. Miss McKenna is a graduate of St. Michael's Hospital and in Public Health Nursing of 1930 at the School of Hygiene, University of Toronto.

A campaign is now being organized for the purpose of raising $250,000 to build a new one hundred bed institution replacing the Present Prince Edward Island Protestant Hospital.

OBITUARY

DR. JOHN A. HUTCHINSON

IN the death of Dr. John A. Hutchinson, who for thirty-nine years served as Medical Officer of Health of Westmount, the Canadian Public Health Association has lost one of its most sincere friends and advisers. Dr. Hutchinson was one of the oldest practitioners in Montreal and passed away at his home, January 24th, at the age of seventy-seven years. Born at Musquodoboit, Nova Scotia, he was educated at McGill and Edinburgh Universities. In 1890 he was appointed health officer of Westmount, Quebec, where he had made his home. In 1920 he was elected President of the Canadian Public Health Association. He gave most generously of his time and experience to advance the interests of the Association and continued his active support during the following years as a member of the Executive Council. He stood out as an example of a cultured medical gentleman with whom age did not become the excuse to relax in personal or professional exactitude. As Medical Officer of Health of Westmount he had the entire confidence both of the profession and of his fellow-citizens. He is survived by one son, Dr. John W. Hutchinson of Ottawa, and one sister, Mrs. David Drysdale.

DR. E.-M.-A. SAVARD

Dr. E.-M.-A. Savard, Inspector-General of the Provincial Bureau of Hygiene, Quebec, passed away on August 8th after a long illness. Dr. Savard practised medicine at Sainte-Marie de Beauce and later at Quebec. After a prolonged visit in Europe, his interests turned to preventive medicine, and he was one of the first in the Province of Quebec to obtain his degree in Doctor of Public Health. He became District Inspector at Rivière-du-Loup, and later chief of the Provincial Bureau of Montreal. The loss of Dr. Savard, whose career has been so fruitful of accomplishment, will be deeply felt by his immediate associates and by the medical profession as a whole.

BOOK REVIEWS

D. T. FRASER, B.A., M.B., D.P.H.; R. R. MCCLENAHAN, B.A., M.B., D.P.H.

Medical and Surgical Year-Book, Physicians' Hospital of Plattsburgh.—*Vol. I*, 1930. *The William H. Miner Foundation, Plattsburgh, N.Y. Pages, 322. Price* $3.50.

In the volume are included the papers presented during the summer of 1929 incident to the Summer Course in Cardio-nephritis for Undergraduates in Medicine, the Wednesday Afternoon Invitation Lectures, the papers of the Cardiac Round Table, the first Beaumont Lecture and collected papers by the staff of the Hospital.

From such a variety of sources one may speculate as to the variety of the material in regard to both subject and quality. There is considerable overlapping and the opinions of contributors are not always in agreement. Many of the lectures show a tendency to short cuts to understanding of certain conditions through the medium of classification; there are the inherent failings of such short cuts. One author gives his own classification of organisms which he claims are associated with enterogenic toxaemias, because, he claims, his classification is superior to others in general use. He uses different "medias" in culturing these organisms.

The report of the Cardiac Round Table does not add much to the value of the book.

While from a historical, possibly sentimental, standpoint, publication of this volume may be justified, this reviewer cannot find that it makes any significant contribution to medical literature and does not, therefore, recommend it to either the student, practitioner or specialist.

N. E. McK.

Hygiene. *By R. C. Whitman, A.B., M.D.. Publishers, John Wiley and Sons, Inc., New York and Chapman and Hall, Limited, London.* 1930. *327 pages. Price* $2.50 *net.*

This is a very comprehensive textbook of hygiene designed for non-medical students. There are chapters on the physical and chemical basis of life, the nature of disease, hereditary diseases of man, mental hygiene, eugenics, air, light, food, exercise, bacteriology, immunity, as well as discussions of the more common specific infectious diseases. As the author points out it is neither a medical text book nor a manual of personal hygiene but rather an exposition of the problem and methods of dealing with the health of the community. Although the scope of the book is wide the individual subjects have been dealt with adequately and certainly readably. It can be recommended to the educated layman wishing to better his knowledge of the problems of hygiene.

D.W.C.

BOOKS RECEIVED

Hygiene. By R. C. Whitman, A.B., M.D. Published by John Wiley and Sons, Inc., New York, 1930. 327 pages. Price $2.50.

Civilization and the Cripple. By Frederick Watson, Published by John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, W. 1, 1930. 120 pages, 34 illustrations and map. Price 10/6 net.

Nervous Indigestion. By W. C. Alvarez. Published by Paul B. Hoeber, Inc., Medical Publishers, 76 Fifth Avenue, New York City. 297 pages. Price $3.75.

CURRENT HEALTH LITERATURE

D. T. Fraser, B.A., M.B., D.P.H.

Typhoid Fever Apparently Spread By Boiled Lobster. *Gaylord W. Anderson and Clarence L. Scamman. The Journal of Preventive Medicine, Volume 4, No. 5. September,* 1930.

Fifteen cases of typhoid fever, in thirteen of which the infection is attributed to boiled oysters, are reported. The cases occurred from July 1st to July 19th in one community, 5 of the cases being in one family. With the exception of two, adults only were involved. The economic status of the patients suggested that the responsible food might be a delicacy rather than a staple article. The evidence, though admittedly incomplete, strongly suggests that boiled lobsters served as the vehicle of infection. In this connection the report states, "the most logical assumption is that the employee who later died of typhoid had contaminated one or more barrels with his vomitus or excreta, a possibility readily admitted by the proprietor. The slime in the barrel would have served as an excellent culture medium."

This report is a fine example of good public health work and shows what may be accomplished by thorough epidemiological investigation of even a small typhoid fever outbreak.

The practicability of the Aschheim-Zondek Test for Pregnancy. *Edwin M. Robertson, Edinburgh Medical Journal,* 37, 124 (1930).

A test for pregnancy which would be easily applied and which would be fairly certain would be of considerable clinical value. This report is from the Pregnancy Diagnosis Station in Edinburgh and deals with a total of 907 cases, of which 479 have been carefully controlled. The uncontrolled cases should not be used for evaluating the test. Of the controlled cases 467 (97.3 per cent) were correctly diagnosed by the Station, 288 as positives and 179 as negative. The remaining 13 cases (2.7 per cent) were incorrectly diagnosed. This report, in line with other European results, indicates that this test is a simple, fairly accurate diagnostic aid.

The test is based on the discovery of Aschheim and Zondek that urine from a pregnant woman contains ovary-stimulating hormones. When pregnant urine, or an extract of pregnant urine, is injected into an immature mouse, sexual maturity is produced and characteristic changes result in the ovaries. These changes can be seen macroscopically. The ovary-stimulating substance in the pregnant urine is similar to that secured from placenta, as recently described by Collip. In performing the test a simple extract of the urine is injected twice a day for three days in young mice. On the fourth day the animals are killed and the ovaries examined. Development of the ovaries with blood-filled follicles is the positive sign. Requiring only a small number of young mice the test is easy to carry out and could be done in departmental laboratories as an aid to physicians.